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A MONTHLY JOURNAL DEVOTED TO THE
DISEASES OF INFANTS AND CHILDREN

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EDITORIAL.

A SYMPOSIUM ON TEETH AND THEIR NEIGHBORS.

The ARCHIVES began its last volume with an editorial on the care of the deciduous teeth. We present in this number a symposium on almost the same subject, for it happened that the pediatrists in both New York and Philadelphia in November and December invited their friends, the dentists, to address their societies, believing, as the ARCHIVES does, in the importance of the care of the teeth, and that all too little has been, and is being, said about the teeth by doctors.

We are sorry that we shall have to wait until February to publish the illuminating article by Dr. Stathers on "Orthodontia," but its appearance then will serve perhaps to enable us to review the points raised in the present symposium. Dr. Oppenheimer's paper calls attention to a region close to the mouth—the accessory sinuses—and both in Dr. Zentler's and Dr. Jordan's articles and in the discussions are adenoids taken up.

Most of our readers, we think, will agree with Dr. Jordan that, for esthetic reasons, at least, it is best for children with wet diapers to be changed instanter, but that many will agree with his contention that this is a frequent source of adenoids we doubt. Surely, were this so, there would hardly be a child without adenoid symptoms, particularly among the less enlightened classes. We are certain that they may be kept covered and warm if they sleep in sleeping bags, and we doubt if it can be verified by statistics that infants suffer from almost constant colds. Certainly in the climate of New York City, and that is not too salubrious, this universality of phlegm does not exist. Nor are we quite so willing to attribute adenoids to the presence of mouth-breathing as mouth-breathing to the presence of adenoids. Still, Dr. Jordan's contention merits consideration, for we are not yet arrived at an adequate solution of the cause of these troublesome growths which we find in all sorts and conditions of children, in many climates, in many lands, and which the art of painting convinces us have existed, in the Spanish royal family at any rate, as far back as Philip II. (And who knows but this monarch's mouth-breathing was responsible for his being "an incorrigible" and for his cruelty and the oppression of his reign? Or, had some competent school inspector detected them, and some laryngologist "hooked out" Philip's adenoids, who shall say that the Duke of Alva might not have brought peace and plenty to the Netherlands and the Invincible Armada never have set sail?) So the inquiry is certainly justified.

Of late, however, there has arisen a tendency to regard the presence of adenoids as dependent upon a disturbed function of the ductless glands, perhaps a compensatory hyperplasia due to hypoplasia of the thyroid, or because of the location of the adenoid tissue in the vault of the pharynx the surmise has been made that its relation may be closer to the hypophysis than to others of the chromaffinic system. The improvement in weight, height and general welfare which follows the removal of adenoids may be due as much, think Crookshank and others, to a restoration of secretory balance as to an increased oxygenation of the blood. This is a line of thought which offers a somewhat different method of approach to this problem and which may result in our gaining a real knowledge of what has up to now been very unsatisfactorily explained.

Our readers may wonder what will become of the tooth brush and of carefully instituted tooth-brush drills if brushing the teeth is not the prime factor in keeping them clean, and surely the emperors and empresses of the kitchen will consent with reluctance to begin their masterpieces with dessert and end with the roast. Still the world does move, and if it be better to end a meal with meat than with pudding, why shouldn't it be done? Certain it is that we should give more attention to the preparation of foods for the children, and neither boil out and throw away all the necessary salts from their vegetables, nor give them too finely refined flour in their bread. If our friends the dentists can show us how to approach in our descendants the perfect teeth of our ancestors, we will gladly forgive them the torture they inflict on us.

We must all, then, as pediatrists, be instant in well doing, and, considering a perfectly formed set of teeth as one of the most valuable as well as most attractive equipments that an individual can have, do all that lies in our power to insure such. We must feed the prospective mother right; we must feed the child right; we must watch over the deciduous teeth; we must insure nose-breathing; we must coöperate with the dentist and attack decay and irregularity. Then shall pleasant smiles of gleaming and well-approximated teeth greet us, and our fame be great in the land.

ORIGINAL COMMUNICATIONS.

THE SURGICAL ANATOMY; DIAGNOSIS AND TREATMENT OF THE INFLAMMATORY AFFECTIONS OF THE NASAL ACCESSORY SINUSES IN CHILDREN.*

BY SEYMOUR OPPENHEIMER, M.D.,
New York City.

That sinusitis occurs much more frequently in children than is generally considered cannot be doubted, and this statement does not apply only to the older child, but also in many instances to the small child and infant. From a careful study of the early anatomic development of the sinuses, it seems probable that many cases of meningitis are the result of unrecognized inflammation of some of the sinuses, as the symptoms of sinusitis are more or less obscure in children. That this should be so, can readily be appreciated from the structure of these parts at an early age, as there is a great variation in both their size and shape; they are surrounded by much softer bone than at a later period of life; there is a more profuse development of the lymphatic and vascular systems and the mucosa is in most intimate relation with the osseous tissue, so that slight inflammation of the former must produce some pathologic change in the latter. In the child, my experience has been that chronic sinusitis is not as frequent as in the adult, but acute and subacute sinusitis is common, and it will be found upon careful examination that many instances of postnasal catarrh in the child are but symptoms of some inflammatory condition of the adjacent sinuses.

In connection with the anatomic development, it should be remembered that the maxillary sinus is well defined, although rudimentary at birth, and even in the fetus it is found about the fourth month, so that inflammation of this sinus at an early age is not infrequent. From this early form, in which it has a triangular shape, it undergoes but little change until the second dentition, when the development of the molars and bicuspid teeth play an important part in its relation to the bones of the face. Previous to the completion of the first dentition, the odontoblasts are in the most intimate relation with the floor of the sinus, which continues to develop, but does not reach the adult type until about the twelfth year. The thickest wall is then found to be formed by the body of the superior maxilla posteriorly, while the orbital wall superiorly is of extreme tenuity. Much previous to this, however, accessory foramina are found as in the adult, and the stomata opens into the middle meatus at the posterior end of the semilunar hiatus.

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* Presented before the Pediatric Section of the New York Academy of Medicine, November 14, 1912.

Most important in the child are the inflammatory affections of the ethmoid cells, these cells and the antra being more frequently involved than the frontal and sphenoidal sinuses. Evidences of the ethmoidal area are seen in the fetus about the eighth month, but development into distinct cells does not commence until the fourth year, and from that period on these tissues are susceptible to morbid changes, the cells reaching their maximum development about the twentieth year. In the child, as in the adult, the middle turbinate body is essentially a portion of the ethmoid area, although its anterior end is thinned out, is small and runs parallel to the perpendicular plate, so that the lower border is deflected inward. At about the eighth to the tenth year one finds that the ethmoidal ostia open into the nasal meati, and for surgical purposes, and especially in the recognition of morbid changes, the cells can be grouped into an anterior mass communicating with the middle meatus, while the posterior group opens into the superior meatus. The anterior group is by far the most important, as its stomata are found along the semilunar hiatus and the fissure between the ethmoidal bulla and the inferior turbinate body, at a location where infection from intranasal morbid changes most frequently takes place. The anterior cells are more numerous than the posterior, although the latter are larger as regards the capacity of the individual cells, and their stomata are much less in size than those of the anterior mass. As the internal wall of the orbital fossa forms the external boundary of the ethmoid, the possibility of orbital symptoms, as a complication of ethmoidal infection, is apparent. In operating upon this region this relationship must be borne in mind on account of the extreme thinness of the ethmoidal orbital wall and the danger of injuring the contents of the orbital cavity.

Previous to the seventh or eighth year the frontal sinus is usually not developed, although not infrequently it is present as early as the fifth year; but before puberty, it does not extend far up in the frontal bone, but then a marked change takes place until the eighteenth year, when its full development is accomplished. The anatomical and surgical relation differs in no way from that in the adult, excepting that its relation to the cranial cavity, on account of the thin posterior wall, is most intimate, and this must be considered in relation to inflammatory processes.

The sphenoidal sinus may show a definite cavity as early as the third year, while by the seventh year it is well developed, and while its inflammatory changes have not been as much studied as have the other sinuses, yet I am of the opinion that it is more frequently involved than is usually considered. Its lateral walls are largely within the intracranial cavity, and especially is this to be considered in relation to the development of obscure cases of basal meningitis, as is also its intimate relations laterally and superiorly with the internal carotid artery and cavernous sinus.

The recognition of sinusitis in the child is more difficult than in the adult, as the symptoms are usually obscure and rarely characteristic, and it is unusual to have a single sinus involved to the exclusion of the others, the rule being that more than one sinus is affected at the same time. Under such circumstances, one can well appreciate the difficulty of differentiating individual inflammatory areas. When the upper sinuses are the seat of a purulent inflammation, the discharges may reinfect those lower down, and especially the maxillary antrum, so that the soft tissues around the stomata are kept irritated and swollen and it becomes most difficult to differentiate the exact underlying faulty condition.

The frequency of the infectious diseases in childhood and the concomitant inflammatory changes of the nasal mucosa explains why the sinuses should be involved during this period, and especially does this occur in influenza, scarlet fever, measles and pneumonia. In the vast majority of cases there is a primary inflammation of the nasal mucosa and the sinuses involved become so from direct extension of this inflammation irrespective of its basal cause, the swelling of the soft tissues around the sinus opening causing the secretions to be retained as a result of the stenosis thus produced.

In the newborn, antral sinusitis may occur as a result of infection by vaginal discharges from the mother, or from injury, the result of instrumental delivery, and the resultant purulent inflammation involves the soft osseous antral walls. In my experience, this condition arising from these causes or others in small children is a true sinusitis as well defined as that found in the adult, and it is not a tuberculous caries, or osteomyelitis, as has sometimes been claimed. As a rule, affections of the antrum occur during the second dentition, while infrequently errors in the development of the teeth may act as an exciting cause of the empyema.

The ethmoid labyrinth in the older child is especially liable to become involved in all inflammatory affections of the nasal mucosa and in coryza, and in the contagious diseases of childhood these cells are affected in practically every instance, to my mind accounting frequently for suppurative ethmoiditis in later life, which has in reality existed from early childhood.

The recognition of the various sinus affections in the child is more difficult than in the adult, as the subjective symptoms are not clearly defined and such methods of diagnosis as transillumination are of practically no value. The use of carefully made Roentgen plates, however, is of great service, especially as regards the presence of pus in the antra or frontal sinuses, and previous to the tenth year the use of the X-ray is the most valuable diagnostic medium that we possess. The presence of frequent headache should always occasion suspicion of sinus inflammation and occasionally when the parts are tender to touch over the sinus involved, bearing in mind, however, that localizing pain is difficult with any degree of accuracy in the very young. In acute sinusitis, pain of an aching character is almost invariably present at some time during the course of the inflammation, but in chronic cases it is very frequently absent, unless the secretions are retained under pressure when it may become most intense.

A marked symptom of great diagnostic value, when present, is the cessation of pain with the appearance of free nasal discharge and the return of the pain when the discharge lessens or temporarily ceases. The presence of discharge, especially if unilateral and purulent or semipurulent in character, is always of diagnostic value, and especially if intermittent. If there is lymphoid tissue in the vault of the pharynx most marked on the side from which the discharge comes, it will often be found that the adenoids alone are not the source of the continued coryza from which the child suffers, but, in addition, there is a sinusitis. The location of the discharge is of great value in determining which sinus is affected, and the method of ascertaining this differs in no way from that in the adult, which is so well known as to require no further discussion.

Aprosexia and disturbance in the general health are more or less inevitable concomitants of chronic purulent sinusitis, while complications, as in the adult, are not as frequent, although orbital symptoms are not uncommon. In the so-called strumous child, where there is a purulent nasal discharge with excoriated upper lip and marginal blepharitis, with frequently corneal ulcers, purulent sinusitis usually of the antrum and ethmoid cells exists, and while serious organic osseous changes are not present, yet when they do occur the ethmoid structures are most frequently involved. In purulent inflammation of these sinuses, and especially in that acute fulminating type sometimes seen, serious orbital complications may ensue as a result of pathologic changes in the correlated vascular sinuses, with the development of thrombosis of the cavernous sinus and resultant pyemia, meningitis and death. In the milder form a symptom not uncommon and always of diagnostic value, is edema of the eyelids from vascular pressure. If the confined pus is released promptly from the affected parts, no serious results take place. In inflammatory processes affecting the maxillary antrum it is not uncommon to find some involvement of the osseous structures of the superior maxilla, if the purulent sinusitis is long continued, but in the majority of instances the affection presents rather a benign course and is only too frequently unrecognized and treated as "nasal catarrh." After cleansing the nasal chamber the reappearance of pus in the middle meatus is indicative of antral suppuration, but in older children puncture of the lateral nasal wall of the antrum is necessary to recognize the condition present.

As a result of neglected rhinitis, inflammatory changes in the ethmoid structures are frequently found, but it has been my experience that isolated sinusitis is uncommon. In younger children the antrum is apt to be also involved, whole in older children the frontal sinus may be simultaneously affected. On account of the relation of the complicated ethmoid system to the other sinuses and the fact that pathologic changes occur here so frequently as a result of the infectious diseases of childhood, it will be found that this sinus is the primary source of infection in the great majority of cases of pan-sinusitis and that this relationship is especially emphasized on account of the rather intimate connection of the various stomata of its component cells with the other sinuses, so that the presence of a purulent discharge is almost impossible without it involving other sinuses to a more or less degree.

As a result of the late development of the frontal sinus, as has been previously pointed out, chronic changes are unusual, but its involvement in the older child during acute intranasal inflammation is much more frequent than currently considered. The recognition of inflammatory changes in this region does not differ from that in the adult, and the presence of pus in the middle nasal meatus will greatly aid in establishing the diagnosis, although it may be easier to eliminate suppuration of the frontal sinus than to define its presence.

The recognition of purulent sphenoidal sinusitis is by far the most difficult, as it is practically always combined with ethmoidal changes and the symptoms are not characteristic. Severe occipital, or vertical headache with more or less dizziness, is suggestive of retained secretions in this sinus; the discharges are scant and usually become inspissated in the nasopharynx, or along the posterior portion of the vomer and floor of the choanæ, and it will be found that not infrequently the condition cannot be recognized until exploration has been made of the interior of the sinus, but in the young adult this should not be done until the presence of other sinus affections of a purulent character have been eliminated.

The treatment of sinusitis in the child should always aim to destroy as little tissue as is consistent with obtaining permanent results, and, as far as possible, the intranasal mucosa should be preserved if operative measures should become necessary in the individual case. Palliative treatment will permanently cure the majority of acute sinus inflammations where such treatment is intelligently directed toward free drainage. Previous to the employment of surgical measures, therefore, the use of warm alkaline sprays and weak epinephrin solution to reduce the congested mucosa, with, if the case is severe, rest in bed, the employment of laxatives and such general measures that may be indicated in the particular case, will often produce the most happy results, and in this connection it should be remembered that the tendency of acute sinusitis is toward cure, and the use of the measure outlined will not infrequently remove the inflammation when operation would have been resorted to unnecessarily, with possibly much less satisfactory results.

Where the sinus disease has continued and resists treatment, it will often be found that the general health of the child is more or less seriously affected previous to the development of the nasal affection as a result of the original disease causing it, and until proper care of the general health is instituted local measures alone will not be of great avail.

Intranasal treatment I believe to be primarily indicated in all cases of sinusitis in children, but it should be strongly emphasized that the turbinal tissue should be preserved, and while it is necessary at times to remove the anterior end of the middle turbinate body, yet the removal of its entire structure to reach the stomata of any of the sinuses is not warranted. When possible, drainage should be obtained through the natural openings, and to accomplish this it is proper to remove enough of the osseous tissue at such points as may be required.

When the frontal sinus is involved, its relation to the anterior group of ethmoid cells is such that attention must be paid to them before the inflammation of the mucosa lining the frontal sinus will subside. When the antrum is diseased, inflammatory changes, as a rule, readily subside under ordinary treatment, but in obstinate cases, after fracturing and pushing aside the inferior turbinate body, a large opening should be made through the inferior meatus into the sinus and the parts drained in this way, the use of irrigation or not depending upon the character and chronicity of the purulent discharge.

In certain fulminating forms of sinusitis in the child and in persistent suppurative cases resisting endonasal treatment, with marked impairment of the general health or other violently acute symptoms, an external operation will be indicated, bearing in mind, however, that previous to any radical external operation in the child, a most careful examination should be made for any morbid changes in adjacent areas which may be keeping up the sinusitis by interfering with drainage, as it has been my experience that in not a few instances treatment for a considerable time may be of no benefit until a hypertrophy of the middle turbinate body has been removed, or an adenoid mass in the nasopharynx, which has acted as a constant source of reinfection. It should be emphasized that any enlargement of the middle turbinate body is a serious obstacle to the cure of inflammatory changes in any sinus, and until this has been relieved the sinusitis will prove most obstinate to treatment.

Free drainage must be secured before cure can be obtained, and if intranasal treatment fails to obtain such a result, then whatever radical operation may be selected should be performed. It should also be emphasized in this connection that free drainage means free nasal respiration, and this is another prominent factor that must be taken into consideration in the surgical treatment of these conditions. In addition, it is essential that when pus is found in any of the sinuses it must be evacuated as a surgical principle and granulations and necrosed tissues must be thoroughly removed. On this basis rest the surgical treatment of all chronic sinus affections, with the various modifications of technic in the care of the individual sinuses dependent upon the peculiar anatomic structural characteristic of each.

When the external radical operation on the frontal sinus is under consideration, it is essential, therefore, as a preliminary step, to remove the anterior portion of the middle turbinate body in order to secure thorough drainage, and not infrequently this procedure may bring about a cure. The external operation on the frontal sinus in the young should be performed with the greatest reluctance in the absence of definite external or intracranial symptoms, and when it is necessary to so operate on this sinus the method of Jansen should be performed, that is, in young children having small sinuses, the anterior and inferior walls, including the supraorbital margins, are removed; while in older children with larger cavities, it is well to retain some of the osseous tissue and form an anterior bony flap. In those cases where the frontal sinusitis has been unrecognized, a fistula may have resulted and the condition has possibly been treated as a dacrocystitis. The only method by which relief may be obtained is by thoroughly opening the sinus, externally cleaning out the anterior ethmoid cells, which are always involved, and obtaining free drainage through the nasal chambers.

In children, the antrum rarely requires external operation, as opening through the lower nasal fossa with irrigation is usually sufficient to obtain a cure of the suppuration. In young children operative work upon the maxillary antrum must be performed with great caution, on account of the relation with the teeth at this age, as such procedures during the formative period of the teeth are apt to result most disastrously.

As a result of these studies, it has been my experience that in young children radical external operative procedures for the relief of purulent sinusitis are rarely indicated and are not as productive of satisfactory results as the more conservative intranasal procedures, and while the same may be said of older children, yet in such, when the sinuses approach the adult type, the same indications for treatment and the same operative procedures apply as in the adult.

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SERUM DIAGNOSIS OF BACILLARY DYSENTERY IN INFANTS.—W. P. Lucas, J. G. Fitzgerald, and E. H. Schorer (*Journal of American Medical Association,* 1910, Vol. LIV., p. 441) believe that in the conglutination reaction we have a means of serum diagnosis in infections by the dysentery bacillus which is far superior to any other as yet devised. Of 45 cases of infantile dysentery ("infectious diarrhea") dysentery bacilli were isolated in 38 cases (84.4 per cent.). In 35 of these bacteriologically positive cases mannit-fermenting strains only were isolated. The mannit-nonfermenting variety (Shiga) was isolated in 3 cases, in one of which it was found in conjunction with fermenting strains. Dysentery bacilli (acid mannit) were found in 1 of 15 control cases. Evidence of reaction on the part of each patient to either mannit-fermenting or mannit-nonfermenting types of dysentery bacilli was sought in the blood serum. The serum in many cases was tested at intervals in order to determine the time of occurrence in the disease of a positive reaction by each method. Reactions with the Flexner strain were much more frequent than those with the Shiga strain; this is owing not only to a direct relation to the organisms producing the infections under consideration, but also, in all probability, to a greater agglutinability of the Flexner organism. In the doses employed, fixation reactions were obtained with the Flexner, but not with the Shiga strain in over a quarter of the control cases (28.5 per cent.). It was found with both Flexner and Shiga much more frequently (50 to 60 per cent.) in the positive cases subsequent to the first week. A positive agglutination reaction was obtained in one control case to Flexner; it occurred in 55.5 per cent. of the positive cases with Flexner ranging from 9 per cent. during the first four days to 75 per cent. at the third week (thirteen to sixteen days). In about half as many cases a reaction was obtained with Shiga.—*American Journal of Obstetrics.*

NERVOUSNESS IN CHILDREN: HOW TO PREVENT IT.*

BY TOM A. WILLIAMS, MB.CM., EDIN.,
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It is by means of the nervous system that man not only regulates his bodily nutrition and activity, but by it comes in contact with his physical environment and his fellow beings. Hence any disorder of this machinery is shown in his conduct with relation to his surroundings.

What more important task than to prevent those disorders? Now many of these arise from within from some defect in the apparatus. Perhaps it is of poor quality, perhaps a portion has been destroyed, perhaps it is poorly nourished. Such defects are either irremediable or are problems for medicine, strictly speaking. I shall not speak of them here and now.

But there are other disorders of smooth functioning of the nerves fostered by bad management and imposed from without upon the individual, helpless in his ignorance of his own being and its relation to the world, what he is and where he stands and what he should do.

In the vastly significant drama of Lengyel, "Typhoon," recently translated and played in Paris, since played in New York, the Japanese hero is made to animadvert upon the helplessness and lack of motive in our modern western world. He says:—

"These people are filled with vast energy which is stirring blindly and ineffectually without motive or end. The world must bow to the scientific, who know where they are and what they want."

It is to help to substitute for our former attitude of incompetence and empirical muddle a scientific conception of our duties toward children in preventing the nervous derangements which arise from bad management that I am asked to come before you now as a cog in the great wheel of preventive medicine which has begun to turn in order to save our civilization from reproach and failure.

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* Part of the Public Instruction Course given last winter by the Medical Society of the District of Columbia and the Woman's Clinic.

Nervousness. Others will speak of the physical causes, *e.g.*, teeth, adenoids, dyspepsia, anemia, etc., which provoke inadequate action of the nervous system.

But before proceeding let us reprehend the fallacy of magical cures, surgery of the cranium and such like, which newspapers lead us to look for. I feel that they misrepresent the judge of our juvenile court in saying that he believes in curing an incorrigible boy in this way—although a boy occupied by a sore head has no inclination for mischief and a boy stupefied by narcotics has no will for it.

But nature knows no magic. Both prevention and cure are the work of insight and patience and intelligence. There is no royal road. It needs intellectual labor, and those who cannot give it must either leave their children derelict or adopt as best they may the poor substitute of rules of guidance and conduct for their young people. These may possess the letter of truth but lack always its spirit until read into them by sympathy. They are sometimes better than nothing at all, at least for the thoughtless, but hardly consist with successful democracy, which demands intelligence to apply in its management, of which the management of its growing citizens is the prime necessity.

The psychologic types which tend toward future nervousness may be conveniently divided into five.

I. *Inertia.*—This may arise from the indolent or inert habits of the child in whom the body feeds on the mentality* or avoids numerous occasions of psychologic effort, practice in which is essential for successful adaptation when the protection of the family ceases. When need or the arousal of conscience stimulates the lethargic psyche of a young person of this type, the mastery of life's rudiments becomes a tremendous load which may break down the psychic equilibrium, producing what is colloquially termed a nervous breakdown.

The development of this intellectual lethargy is largely contributed to by the widely current fear of overloading the childish brain, which emanates from the false doctrine concerning its fragility. As a matter of fact, the brain never works more actively than in childhood. The acquisition of language alone is a colossal feat; and the fresh adaptations to environment which are demanded every few minutes of a child in the ordinary family life would be a tax on the strongest man; and yet a child suffers them gladly; and, indeed, demands employment of his activities. In the "Psychology of Intellectual Precocity" (Pedagogical Seminary, May, 1911) I have discussed the favorable effects of ordered psychologic activity upon mental health; so I need not recapitulate. Suffice it to say, that it is most pernicious to discourage the psychic activity of a child. The parents' duty is to guide it into channels which foster satisfactions of a more permanent kind than the fatuities into which they are usually allowed to drift.

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* Shakespeare's wisdom makes Fernando say:

"Fat paunches make lean pates, and dainty bits
Make fat the ribs and bankrupt quite the wits."

—*Love's Labours Lost.*

The prevention of this danger to psychic health is obvious enough not to require setting forth.

II. *Overintensity.*—The antithesis of the preceding type is the child of restless and excessive neuromuscular energy. This quality is, of course, a desirable one, provided that it is not stimulated by ambitions and enthusiasms to interfere with nutrition or sleep, and is not perverted into a craving for activity for its own sake.

In order to prevent these dangers, parents must insist upon the prime need of food and rest; and the child must be taught to inhibit for short periods the hyperactivity which may in part proceed from habit.

Such persons, when grown up, are apt to be proud of their "overintensity." It is necessary to teach them the folly of this attitude, and that the man who runs till he drops is a fool for his pains, and does far less work in the end than he who works steadily.

III. *Psychasthenia.*—When the natural intellectual activity of the child is restrained, more especially when its initiative is prevented proper play, the overinhibition of spontaneity which ensues gives rise to grave danger of the development of a psychic trend, which has been called by Janet psychasthenia.

In this condition a feeling of insufficiency breeds (1) morbid fears and their moral distresses, (2) intellectual ruminations and (3) a motor fatuity, taking the form either of a general restlessness or a specific unrest known as tic. This represents the morbid reaction to a particular discomfort, which in turn only increases the discomfort at the relief of which it is aimed. The tendency to scratch an itching scar illustrates a mechanism with which everyone is thus essentially familiar.

I have recently cured a case of a girl of eight, who for four years had been impelled by the craving to scratch her nares to the bleeding point, so that she was waxy in appearance from anemia.

A child aged two would scratch its wrist almost down to the tendons. This case, which I described to the Paris Society of Psychology and published in the ARCHIVES OF PEDIATRICS, 1910, was caused by the psychic inadequacy produced by the intoxication of coffee given the child from the age of three months. The former case was possibly due to a complex psychologic mechanism, the origin of which I did not discover, but I believe it was simple.

The followers of Freud would attribute it to the demands for titillation of an orifice, which, in essence, are sexual in nature. I can only subscribe to this hypothesis in so far as to admit that an organic satisfaction is provided by the manœuvre. The discomfort of craving has many avenues of removal. A classic case is the young girl of Janet's who poured drops of boiling water upon her naked foot to stimulate herself out of the low feelings into which she frequently fell.

Regarding the sexual factor in the induction of psychasthenia so much insisted on by Freud and his followers, I have held that the very plain mechanism of fear of bodily harm from without seems to be a much more fundamental feeling, if one is to appeal to phylogeny, than is that concerning the relations with others termed sexual.

Even Hedonic effects occurring autochthonously in childhood, although of the same genus as that which later effloresces into sexual emotivity, do not by any means in themselves give origin to perturbations of the psyche either in childhood or later. I say in themselves; for I believe that the perverted affectivity from which arises so many obsessions, phobias, etc., is always the product of induction, if not directly and naively from without, at least by logical induction from data acquired by observation or didaction of the conventions of family and social life. The child's avidity to relate himself correctly to these, to behave as a grown up, that being of marvellous privileges, is not sufficiently realized. It makes him seize upon the most trifling detail for imitation. One of his objects is to transcend the amusement he provokes in trying. The shame he feels at the ridicule with which his attempts are so often met causes him to keep them to himself in half shame.

CASE. Thus in a case of which the analysis occupied over a year would accordingly take too long to recount, the obsessions, which were mainly sexual scruples fundamentally, had as their basis the moral and religious repressions of the patient's childhood. It was the horror and loathing of everything pertaining to the corporeal which caused the child when aged six to look upon a hedonic state which used then to occur as a sinful one, which prevented even speaking of it to the mother and which was the incentive for the repression of indulgences demanded by a most affectionate nature; for in the family all display of affection was discountenanced. It was the lurking fear of that which was awful, because unfaced and vague, but which contained inexplicable potentialities for evil, which later permeated the patient's relations with fellow beings to a degree which produced utter incapacity for daily life.

CASE. Let me ask you to contrast, on the one hand, the loss of a quarter of a century of fruitful activity by this patient, the lack of good sense in whose upbringing was so late compensated by what we have learned of psychopathology. On the other hand, the immediate compensation of an entirely similar syndrome in a clergyman's child, aged ten, whom I saw this winter. One day she would be well and the next crying, feeling miserable, tired and dizzy with a dull headache as a result of lying in bed thinking. The preceding summer at school she had been irritable, cross, impatient and quarrelsome with her sister. She had formerly been easy to manage and full of life and joy. Her mother was most anxious, and took pains to avoid startling or fatiguing her, and in the belief that it exhausted the child forbade the impulsive squeezing and kissing which the child frequently desired. She had noticed that the little girl was less impulsive and irritable when having something to do; but she had been taken from school, which seemed to aggravate her nervousness.

The *physical examination* was negative with the exception of a slight hyperopic astigmia and a variable visual acuity without apparent cause.

Psychically intelligence was normal. She was very timid, was hyperconscientious and much concerned at having been reproved for impulsive shouting, for violent hugging of her parents and because of taking some *eau de cologne*. This had really been taken by the little sister who was punished for it. She was sometimes so unhappy and miserable that she did not want other children near her; and she was most unhappy because she was not allowed to show her affection to her father and mother, of whom she is very fond, more especially of the latter. Her dreams are rare, but she recollected one of a white-bearded man who dragged her from the bed by her hair and another of a wild animal trying to eat her. I could not at the time obtain any association from either of these, and, indeed, I was more concerned relieving without delay the intensity of the repressions which made the child's life a burden.

A physical factor complicated the case, the child eating excessively of meats and oatmeal and making her principal meal at night. I believed that this was the initial cause of the irritability of temper and the impulsiveness which led the over-conscientious parents to repress over-much.

Treatment.—Mid-day dinner was prescribed, and a supper mainly of carbohydrates and fruit, after which she should not go to bed for at least an hour. On waking in the morning, the child must make a practice of getting up and going outside instead of ruminating in bed. Parents must avoid nagging her about trifles; and her behavior must be left to take care of itself at present. Her affections must be indulged and reciprocated; she must be given plenty to do, and be sent back to school in a few days. This policy resulted in complete recovery within two weeks, the child being as happy and joyous as she formerly was.

Diagnosis.—I considered this a prepuberal emotionalism attributable to an incorrect dietary and greatly aggravated by parental interference, well meant but entirely injudicious. This last, the psychogenetic factor of the situation, was the main pathogen of a state which might have eventually attained a gravity like that of the case with which it contrasts.

Thus, the psychasthenia of this little girl was cut short long before its root branched into mental manias or before there was a hint of obsessions or phobias. It may astonish you that I include this case in the psychasthenia of Janet, as it is without the stigmata or cardinal symptoms of that disorder, if we except the impulsiveness and the inadequacy which was hardly even conscious. The justification of such a diagnosis need not, however, detain us; for it has been set forth in explanation of the case of a child, aged only two, which I reported to the Psychological Society of Paris in 1910 (see also Archives of Pediatrics, 1910.)

The support craved for when inadequacy is felt is sometimes procured by procedures more intellectual in aspect. Thus to count in series (arithmomania), or to associate artificially certain events, to symbolize, to be absurdly neat or painfully accurate, to want ultimate explanations of the universe, presages (*manie du sort*) are frequent methods of relieving an unpleasant situation, whether autochthonous or provoked from without. The day dream is a frequent defence against a felt inadequacy.

The motor methods to relieve are manifold. Thus a girl of eight used to smack her lips as a symbol of a healing kiss against the noxiousness to others of her carbon dioxide laden breath. ("Juvenile Psychasthenia," *American Journal of Medical Science,* December, 1912, where other cases are described and their management is considered.)

Causes. The sense of inadequacy so characteristic of the psychasthenic patient is a product of undue repression of children by elders. This is the cause of the hyperconscientiousness so often seen in New England. A morbid sentimentality and desire for soothing and sympathy is one of the forms it may take. The inefficiency to which this leads is well shown in Henry Mackenzie's "Man of Feeling," and in the "*Journal Intime*" of Amiel. Self-pity and gloating over one's own misery may follow. From this to ideas of unworthiness and delusion of persecution is not a far cry. Hypersensitiveness in conjunction with pride is food for future paranoia; for they will preclude the collisions of daily life which prevent shutting the child's mental life into itself and the breeding of a set of ideas which contort the universe into a fancied conspiracy against a martyred unfortunate.

The _prophylaxis_* against this unhappy psychosis is the obvious and simple securing for children opportunity for psychologic activity, and the withholding from them of the fear-producing aspect of religion and story, and of the weakening of their fiber by undue petting and babying. The removal of mystery by truthful and clear explanations and the making light of those facts too complex for a child's understanding are principles to be insisted upon and carried out by the parents.

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* The first presentation of the subject beyond the usual commonplaces found in that work was the author's "Psychoprophylaxis in Childhood," an address at Yale before the American Therapeutic Society in a symposium on psychotherapy in May, 1909. It is published in "Psychotherapeutics" (the Gorham Press, Boston—Toronto)—in *Jour. Abriorm. Psychol.*, June, 1909. Its material has been much utilized by other writers, often without acknowledgment.

The promotion of spontaneity in activity is well secured by games. These are particularly important for girls. It is a crime against childhood to inculcate the prohibitions to which so many young girls are subjected. Tenderness should be avoided and young ladyhood should be postponed until growth is complete. Even more essential is active exercise for free psychologic development than for bodily strength.

Another most reprehensible practice is the prudish restraint with which the sexual function is treated between parents and children. Many a child's life is made miserable by the mystery and shame surrounding this function. I see many such cases, both in men and women, whose psychic happiness has been destroyed for years by unnecessary scruples arising from the terror bred by an ignorance for which parents are culpable.

IV. *Hysteria.*—Just as inimical to psychologic health as is unwise repression is the utter lack of restraint in which some children are indulged.

This breeds the happy-go-lucky, irresponsible character, in whom a quite different form of nervous derangement is almost inevitable. Such children are unpracticed in inhibition. They are the prey of impulsions. These are generally induced with great facility by ideas implanted, often by a companion, or sometimes derived from some event of an impressive character. These are the people who become the victims of the psychic contagion of the crowd, who stampede at a fire, who make the pilgrimage in search of health led by the dictates of fashion, whether in the guise of religion or merely as a form of snobbery. It is these people who so readily imagine themselves diseased and who are so readily freed from their ailments (for a time, at least, until they fall again victims to the suggestions around them) by Christian Scientists and other suggestioners or charlatans, including some in our own profession, I regret to confess.

This type of nervous susceptibility constitutes hysteria as defined by Babinski. Undue suggestibility is its criterion. The tendency to it is preëminent in young children, as well as the big children which many adults remain, especially in the lower races, where credulity and ignorance foster susceptibility to the reception of suggested ideas, however absurd. From this, however, no social stratum is immune, yet, even in our Western civilization. Indeed, many of the wealthy and high-placed are, where health is concerned, the victims of ideas as näive as those of the veriest savage. There is a class of physicians, alas! who do nothing to counteract the ignorance from which springs this credulous suggestibility. "It is so much easier to manage the patient who does not know so much," many a fashionable doctor will say, forgetting his responsibility for a state of mind which has permitted Christian Science to flourish.

I describe a typical case which also illustrates the mode of treatment to be followed, and for which the prophylaxis is readily seen.

Hysterical Phobia in a Child.—A boy of eight was seen with Dr. A. R. Tynes, at Staunton, Va., in the autumn of 1911. The preceding May he had developed what his parents called hallucinations, which occurred when he was alone only, for he would go errands and play about if he knew he was in sight of anyone at all. There were no night terrors, although he feared going to bed alone, and his mother or father always accompanied him upstairs. Whenever he was alone a spell would occur. The hallucinations were accompanied by a loud cry and a twisting backward of the neck and contortion of the body. He was very rarely still, wriggling about nearly all the time in an excitable fashion. His father and maternal uncle are declared to have had similar attacks in childhood. But it could not be ascertained that the parents had not spoken of some of these before the boy. The mother was overanxious, hysterical and very uneasy when the boy was out of her sight, of which the boy was well aware.

Examination revealed no physical signs of disease of the nervous or any other system. In anamnesis, I found him a sensible little fellow, and I ascertained that it was a snake which he usually saw, although sometimes a wild beast would be seen. His shout was really the name of the animal he saw. He could not describe the snake, except to say its head was like an eel. He remembered well the first such occasion of fright, and the creature then was not a snake but a rooster. He declared that he was never actually afraid of any animals. Indeed, on one occasion, wearing a red sweater, he chased a bull away with stones. On another occasion, he went into the cellar to look for the bogey-man. He said that his only fear was that of being whipped by his father when he was naughty, and that of this he was "not very frightened."

I could not, in the short time at my disposal, penetrate the psychogenesis completely. My questions soon showed that the hallucinations were not true ones; for when I asked the boy if when he looked round there was really an animal jumping on his shoulders, he had to reply "No"; and that he never actually saw, heard or felt what he feared. He then spontaneously declared, "I reckon my imagination gets away with me." I then asked him, "Why do you not look round each time you fear the animal behind you?" He said, "It does not give me time to think of it; it comes so quickly sometimes; and I shout and run before I can recover myself." When asked, however, he said he was not easily startled as a rule.

Diagnosis and Prognosis.—Familiarity with the mechanism of terrors of children enables one to interpret this boy's case as a phobia against being alone, produced by the foolish anxiety of his mother. This affective state was an induced one, therefore, produced by the idea of some "dreadful consequences" which might occur to a little boy when not protected by his elders. But the morbid reaction had become a habit; so that even though the initial cause were suppressed training would be required to overcome the facile inductibility of the terrors. Inhibition of his undue impulsivity should also be undertaken.

Treatment.—Accordingly the following procedures were outlined and the reason for them clearly explained to the boy and his father. Firstly, he must gradually accustom himself to go out alone, first for half a block, then for a whole block, and finally round the corner. While doing this, he could hold himself in hand, his attention fully awake to the need of manly behavior and the importance of recovering from his timidity. Secondly, he must learn to go to sleep without anyone else in the room, remembering what a nuisance is a boy who cannot forego keeping one of his parents constantly at home in the evening. Thirdly, he was shown exercises in slow movement and mobilization by which he could suppress the wriggling tendencies of his limbs and body. His mother should be dealt with rationally too.

Wishing to obtain more precision as to the psychic mechanism, I wrote to the boy asking him to tell me whether he seemed to be in a dream-like or in absent condition when the fears assailed him. I also, of course, wished to stimulate the practice of the reëducative procedures I had prescribed. The following replies were made, and I have recently heard from Dr. Tynes that the boy remains well:—

"*Dear Doctor:* I have your letter. I do not see any animals since I saw you. I never did hear or feel them, but used to see them. It is not like a dream. I hope I can soon write you I am well.

YOUR LITTLE FRIEND."

"*My Dear Doctor:* I beg to thank you for your letter of yesterday to John, Jr., and at the same time report favorable progress in his case. He is now going all about the house and yard alone, and has made a couple of trips to the store where I am employed (about seven minutes' walk) alone. He is certainly very much better than he has been since these spells of fright came upon him. He is getting on well with the exercises that you outlined for him, though he is not yet able to go to sleep alone. However, he goes up to the room alone, turns on the light, undresses and gets in bed, and holds himself together for about ten minutes, but does not seem able to compose himself sufficiently to get to sleep. I am working him up to this as fast as I can, and while I might force him to it at once, I would have to use harsh measures to accomplish it. I am unable to clearly get the idea from him whether after these attacks of fright the animals seem like a dream or an idea. I believe, however, that when he tries to analyze the feeling, that he feels that it was an idea that flashed through his mind at once that these animals were near him, and he knows it was only in his imagination. I am glad to say that he is making a strong effort to get a 'grip' on himself, and I believe that he will succeed. I will let you hear from him from time to time, and if at any time I can answer any questions I will be only too glad to do so as clearly as I can."

These patients are much easier to deal with than are the psychasthenics, requiring less psychological finesse and insight. But they require perhaps more perseverance on the part of physician or parent, because they are less analytic and need more outside help in controlling their impulsiveness and in cultivating the inhibition they lack.*

V. *Querulousness and Ill Temper.* Lack of inhibition may predominate regarding the reaction to unpleasant stimuli and situations, through the natural violence of the infant temper not becoming attenuated by the exigencies of social life. Persons of this tendency may become so intolerable as to require incarceration to prevent them from being a danger to their friends.

In addition to a congenital predisposition, perhaps due to endocrinien instability, excessive irritability of one or more glands, I believe that many of these cases are permitted, if not caused, by unwise indulgence of infantile tantrums by those responsible for the child's care.

No one who observes babies intelligently can fail to be struck by the great facility with which their emotional reactions can be diminished or increased according to the treatment meted out to them during pleasant and unpleasant experiences. Now self-control, so easily taught in infancy, is an arduous task for a child, even as early as at eight years of age; and when puberty is attained, it requires powerful motives, as well as tremendous determination, to conquer a violence of temper which would not have been difficult to subdue in babyhood by a careful and wise mother.

We are now fringing on forms of psychologic reaction comprising disorder of what is termed morality. The same principle of prophylaxis applies to them all. Not only tendency to violence of disposition, but the antisocial habits of lying, thieving, backbiting, envy, all of which may become morbid impulsions, are most readily induced, best guarded against and most easily treated in early childhood.

Conclusion.—Thus the prevention of psychogenetic disorders is only to be accomplished by a study of psychologic principles, and their wise application to concrete situations arising in the home and the school.

The labor and intelligence needed in the acquisition and application of these is not too great a price to pay for the conservation of the greatest asset of a nation, the *potential men and women*—its children.*

1705 N. Street.

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* The successful management of some cases was described in the pediatrics section, American Medical Association, June, 1912, published in the *American Journal of Medical Science*, December, 1912. Their mechanism is discussed in the *Journal of Abnormal Psychology*, November, 1912. The tics were discussed in *Pediatrics*, October, 1910; also in *Monthly Cyclopaedia*, 1909.

RELATION TO, AND INFLUENCE UPON, RESPIRATION DURING CHILDHOOD OF NORMAL AND ABNORMAL DENTAL ARCHES.*

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Whether adenoid growths are the cause or the result of constricted dental arches or *vice versa* has been much debated, but not successfully solved to this day. It is, however, known that proper breathing is interfered with wherever adenoids are present, and as almost always this condition is associated with constricted dental arches, these must be looked upon as a hindrance to proper breathing.

It may be inferred, from what precedes, that the latter condition being incidental to the former, this alone is to be looked upon as a disturbing factor in respiration and not the abnormal dental arches, and it is just in order to prove the contrary and to herald the importance of correcting improperly developed dental arches that this paper is written.

It is important, before delving any deeper into this subject, to establish, first, what normally developed dental arches are and to emphatically call attention to the fact that a normally developed set of dental arches presupposes a normally developed mandible and maxilla. Although more or less extensive measurements of the size of the teeth and of human jaws, from skeletons and from living subjects, were taken and recorded and conclusions drawn therefrom as to what should be the size of a normally developed dental arch, taking as a basis the size of certain teeth, the fact remains that a normally developed mandible and maxilla will be found only where all teeth are existent and are in "proper occlusion," and that where "proper occlusion" exists we have with it "normally developed dental arches," whatever the proportion of the width of the arch to the size of the teeth.

The size (width and length) of the teeth is not generally in harmonious relation with the stature of the individual, nor with the shape and size of the head. In lean, tall children, with narrow, oval-shaped heads, we find sometimes much wider teeth than we find in short, stocky children with round heads. Can we expect a child with an oval face and whose entire stature is such as to point to slender, narrow organs, to have a wide dental arch, and are we to infer that because it is not wide it is not normal just because this child may have wide teeth? A little comparative study of anthropology and zoology will soon show that in all types of animals and in the different species of these types long oval heads have narrow dental arches and round heads have wide dental arches regardless of the size and shape of the teeth.

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* Read before the Section on Pediatrics of the New York Academy of Medicine, November 14, 1912.

It is, therefore, not necessary that a dental arch be of a certain width calculated from more or less arbitrary rules in order that it may be considered as normally developed as long as we have "proper occlusion."

It may be said that teeth are in "proper occlusion" when, while reposing one against the other, the interdigitation of their cusps and the relationship of their inclined planes afford the greatest support to each tooth, to each dental arch individually, and to all teeth and both arches as one entirety.

In proportion as the occlusion is more or less perfect, the dental arches will be more or less well developed and the nearer normally developed the dental arches are, the less deviated from its normal position will the nasal septum be, the larger will the nares be, and as a consequence the nasal breathing will be better. This can be ascertained not only by observing and examining the nose in persons with well-developed dental arches, but also through the actual fact that in widening the upper arch we do obtain a straightening of the nasal septum and a proportionate enlargement of the nares.

This result can be obtained either by a rapid process or by a slow process of widening the dental arch, and many factors are to be considered in deciding which of the two methods should be selected in each individual case. Whether the widening desired and obtained is the result of space produced between the two maxillary halves in opening the maxillary suture, or whether it is the result of an expansion of such portions of the palatal bone as are less resistant between other teeth, where this bone is thinnest, is not definitely established; but from radiographs published by C. A. Hawley, of Washington, D. C., in the June, 1912, *Items of Interest,* it appears pretty certain that the latter is the case. Whether the space produced through widening is ultimately filled out with bone is not certain; it probably is filled with cartilage. It is, nevertheless, certain that no ill effects result from either process and at once obvious to any one familiar with the anatomy of the bones of the head and the relation of the maxilla to the bones of the nose that the nasal respiratory passages must be improved as a result of this operation.

In viewing the condition of the mouth of a child past the age of seven, who was afflicted with adenoids which have not been removed at all or only after its sixth year, we find almost invariably constricted dental arches; wherever adenoids existed in infancy and were discovered and removed at an early age we may be sure to find relatively well-developed dental arches. The latter part of this statement would, of course, indicate that "no adenoids, no constricted arches," and this may safely be said to be true as long as it means that there are, or were, no adenoids right along from birth and through the early age of development until complete development of the bones of the face and the head. The first part of this statement clearly indicates that constricted dental arches do exist where there are no adenoids, but this is only where there are none because they were removed and removed too late; removed after the damage was fully done.

We are facing the picture of a child who, while not having adenoids, does have constricted dental arches, and who shall say that, although this child has no adenoids, it can breathe properly? The very factors which during the early developmental stages have caused a lack of development in the right direction of the upper dental arch, have also influenced the development of the muscles controlling the position of the upper lip—levator labii superiorios alaque nasi and the levator anguli oris. Instead of the upper lip going down to meet the lower lip, and thus to form what the lips are intended for, the closing of the vestibule of the mouth, we shall find the upper lip drawn upward and held there as through a contraction of the above-named muscles. Only through special effort, or when the attention of the child is especially called to it, will it completely close its mouth, and it will clearly be seen, then, that it is done through an unnatural forcing and expanding of the muscles controlling the position of the upper lip.

If the complete closing of the lips of this child is, therefore, not a normal process, and while, as said above, through special effort the lips may be kept closed during the day or, better said, during all such times when it is awake, it certainly cannot be done during sleep, except by applying special bandages.

There is no further need of emphasizing that the child who sleeps with open mouth breathes defectively, and, after what was said above, this defective breathing is clearly traced to constricted dental arches.

Up to that period of the child's life when the adenoids were removed, these, obstructing the nasal respiratory passages, caused the child to look for some other means of breathing and obtained this through the only other available passage—the mouth.

Through the keeping of the mouth open we do not only get the result mentioned above, in connection with the position of the upper lip, but through the pulling inward of the cheeks, as always happens when the mouth is open, the muscles of the cheeks, the zygomatic, the buccinators, the masseters and the muscles controlling the lower lip, the levator and the depressor labii inferioris and the depressor anguli oris, act as compressors of each individual half of the maxilla and mandible and do not allow them to develop laterally, forcing them inward and forward. At the same time the keeping of the mouth open will change the normal position of the tongue, which, in repose, when the mouth is closed, rests flat against the palate or roof of the mouth, and thereby necessarily contributes to a lateral development of the maxillary halves, but which, when the mouth is kept open, drops to the floor of the mouth, assuming an elongated shape and contributing to the forward moving of the lower front teeth and augmenting the contracted shape of the lower arch already brought about by the force of the muscles of the cheeks and lower lip.

The "open mouth habit," which really is not a habit, but a pathologic condition, will not disappear through clearing of the nasal passage by removing the adenoids after they have done their nefarious work. It should not, and cannot, be combatted solely through trying by various means to impress upon the child that it must keep its mouth closed or, perhaps, by "tying up the child's mouth, after the fashion of the Indian mothers, who did it in order that the baby may breathe through the nose" (Dr. A. Lorand: "Das Altern seine Ursache und seine Behandlung durch hygienische und therapeutische Massnahmen).

This condition, commonly looked upon as a habit, is the result of an anatomic change, and not until this anatomic change is reduced from the abnormal to the normal, can we expect "the habit" to disappear.

When, through efficient application of constant force by use of adequate apparatus, which need not, and does not, hurt if properly constructed and adjusted, the dental arches are spread to their normal shape until the teeth have come into "proper occlusion," the lips will close normally, and the child breathe normally—through the nose.

I believe to have made it plain enough that, barring general conditions which may be contraindicative, it is never too early to remove the adenoids, and certainly, and for the same reason, it is never too early to proceed with the bringing of the dental arches into their normal shape, if once it is established, through the signs of faulty occlusion, that they are not normal. The early orthodontic interference is important, not only because of prophylactic reasons, which *per se* ought to be more than sufficient, but also because the earlier the teeth are brought into proper occlusion the easier and more permanently they will be kept so. The need of retaining the teeth in their new position is in direct proportion with the early age during which they were moved.

Sections of skeletons of children's heads, from birth on and up through all the ages during which the permanent teeth are erupting, show that the crowns of the permanent teeth are so situated in the body of the maxilla and mandible that their erupting is guided by the position of the roots of the deciduous teeth. If these are in faulty occlusion, thereby causing abnormal dental arches, when moved and brought into proper occlusion they will, by means of their roots, guide into proper position the crowns of the permanent teeth and we will obtain thus normally shaped dental arches and properly occluding teeth. The force of proper occlusion, at this early age, will be a great factor in keeping the teeth there where moved without need of much retaining appliance, while, if the tooth movement is undertaken later in life, both the process of moving and retaining is of longer duration, and this again is in direct proportion with the late age at which the orthodontic treatment is begun.

It is not to be understood that if faulty occlusion is found at a later age during childhood, or even after the age of puberty, in fact almost at any reasonable age, that an attempt of bringing about proper occlusion should not be made with a view to rendering normal the abnormal dental arches, but the result will only be in proportion to the age when undertaken and, of course, to the severity of the abnormality. Most of these abnormalities grow worse with the advance of age and therefore grow more difficult to correct.

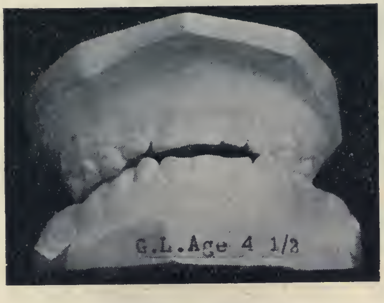

FIG. 1.—Showing effect of adenoids on occlusion.

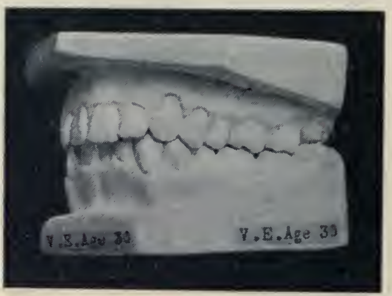

FIG. 2.—Cast showing normal occlusion.

For the purpose of maintaining and establishing unobstructed respiration, those who are apt to come soonest in touch with the child, the pediatrists, are best in a position to sound the warning bugle. If, as soon as they notice the "habitual open mouth" of the infant, they look for adenoids, and remove them if found, thus establishing unobstructed nasal respiration early, perhaps there will be no need of orthodontic interference, for the dental arches may develop normally. I say perhaps, because I am quite certain that some other factors are at work in the proper and full development of normal dental arches which, as said in the be-

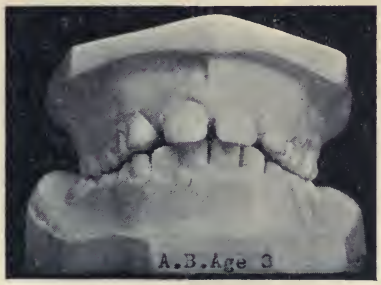

FIG. 3.—Condition resulting from non-interference.

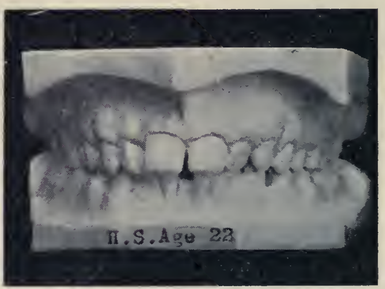

FIG. 4.—Showing adult result of non-interference.

ginning of this paper, presuppose a normally developed maxilla and mandible. The good influence toward this end accomplished by the natural feeding—I mean breast-feeding—of the infant as against bottle-feeding must not be overlooked. Later, during early childhood, the kind of nourishment which gives ample exercise, through need of thorough mastication, will add materially to the development not only of the bones supporting the teeth, but also to all those bones immediately connected with them, such as the bones of the nose, and will, thereby, help, through this means, to a normal respiration and perhaps avoid, as well in early infancy as in later years, the occurrence of adenoids.

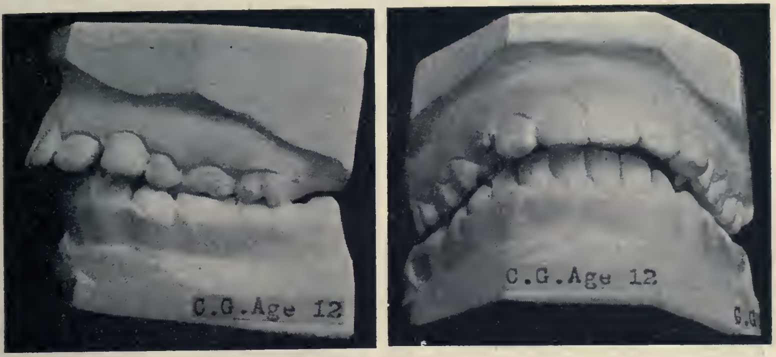

FIG. 5.—Casts of child before appliance was used.

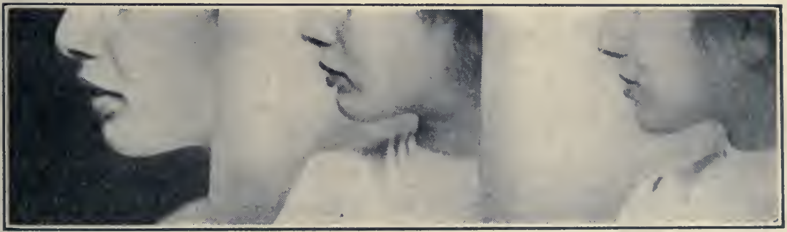

FIG. 6. FIG. 7. FIG. 9.
Showing changes in facial expression due to correction of malposition.

When, in spite of the removal of adenoids, mouth breathing persists, it becomes the province of the pediatrist to look into the further cause of the condition. It will then be found that it is by reason of an anatomic change created by abnormally shaped dental arches, usually bringing about the deficiency in the upper lip to close down upon the lower, and the interference of the orthodontist becomes now imperative, and this at an age as early as it may be possible to anchor appliances on the teeth. The age of between three and four years is none too early.

The cast of the mouth of a child, having had adenoids since early infancy, now four and one-half years old (Fig. 1), presents the aspect of the position of the teeth of a pronounced mouth-breather. The teeth are not in proper occlusion (Fig. 2 showing cast of teeth in proper occlusion) due to abnormally developed dental arches, and the respiration is defective and will remain so, although adenoids were removed at the age of three years, unless through orthodontic interference the dental arches shall be spread until we obtain an expanding of the sides of the mandible, of both halves of the maxilla, and with it a lowering of the palatal bones, bringing the front teeth of the maxilla down to occlude properly with the front teeth of the mandible and thus carrying the lips in their proper position.

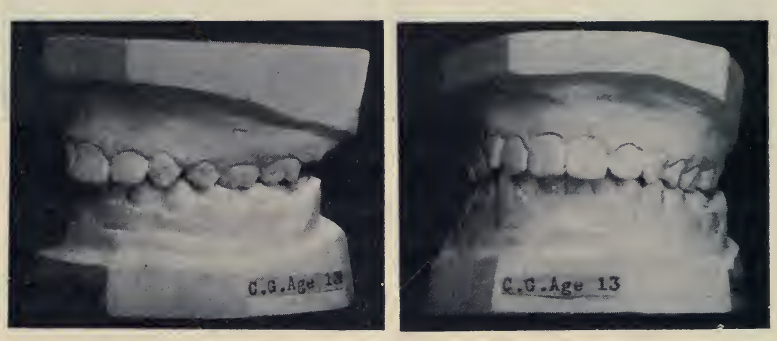

FIG. 8.—Showing change from Fig. 5, after 11 months' wearing of appliance.

The aggravated condition resulting from non-interference can be seen in Fig. 3, representing the cast of a mouth of a child at eight years of age. Examinations of the nose and throat of this child shortly before the casts were obtained indicate that no adenoids were present, and inasmuch as the child had never been operated on for removal of adenoids it either never had any or they have disappeared by a natural process, if such a thing can be, in later years. However, the child is a mouth-breather, and, from what the child's mother can remember, it has been a mouth-breather since early childhood.

It is evident that this child's breathing is defective and that this is due to abnormally developed dental arches. Not until, through orthodontic interference, the teeth shall be brought into proper occlusion, thus giving the dental arches their normal shape, will this child be able to close its mouth properly and breathe correctly.

Fig. 4, representing the mouth of an adult, aged twenty-two, is a good illustration of the fact that abnormal dental arches of individuals who had adenoids and such were removed in late childhood, in this case at the age of ten, if left "to nature to take care of itself," do not get any better, but become always a greater hindrance to proper breathing as a result of aggravated abnormal dental arches, which force, even at this late age, the individual to keep his mouth open, not only during sleep, but in spite of all efforts even while awake, and is a direct result, I am sure, of new vegetations, noticed in the last couple of years, and producing nasal stenosis. The protrusion of the upper anterior teeth has become so accentuated that the lower anterior teeth bite far back on the roof of the mouth creating a constant gap between the upper and lower lip.

Before closing, it may be well, for the purpose of illustrating the need of orthodontic interference, toward obtaining nasal breathing, to present (Fig. 5) the casts of the mouth of a child at the age of twelve, showing the teeth in faulty occlusion due to abnormally developed dental arches, which prevent the lips from taking their normal position and thus create a mouth-breather, as seen (Fig. 6) in the photographs showing the profile of this child, with its lips in a state of repose. Adenoids were removed in this case when the child was ten years old. They were removed for the purpose of establishing better nasal breathing in the hope that the child would lose the "open mouth habit." Two years later, finding that this so-called habit grew worse instead of disappearing, orthodontic interference was resorted to. The profile, in photograph (Fig. 7) shows the result of the position of the lips, obtained after six months' wearing of the orthodontic appliance and the casts (Fig. 8) from impressions taken eleven months after the time when the impressions for the first casts were taken, show the teeth brought into proper occlusion, the dental arches reduced to their normal shape, and, as a result (Fig. 9), the child keeping its mouth unconsciously closed, as well during sleep as while awake, the lips having fully taken their normal position, and breathing through the nose.

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FEEDING IN RELATION TO THE TEETH.

BY GEORGE C. KÜSEL, D.D.S., M.D.,
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It has been said with much truth, that attention to this important subject should have been given by our immediate, if not remote, ancestors.

A study of the teeth of prehistoric man, or one of remote antiquity, reveals a perfection of dental organs the equal of which is rarely met in modern civilization, and then only in people not having been subject to its refining influences, or in those whose contact has not caused them to forego the antiquated customs of their ancestors.

The perfect state of preservation and freedom from decay is due to two important factors—first, the simplicity of the food stuffs and their unimpaired chemical content due to the nonexistence of modern milling processes in flour making and modern cooking and baking; secondly, by reason of the exercise given to the teeth in preparing these simple foods for the digestive and metabolic processes following deglutition.

The much dreaded suppuration from the pockets, formed by the recession or atrophy of the peridental membrane clinically known as pyorrhoæ alveolaris as well as caries and its train of distressing, unhygienic and pathologic processes, is due, in great measure, to the lack of exercise of the teeth.

Are we not now, and have we not been for some time, looking to the lesions of the teeth as one of the points of entrance in tuberculosis of the lymphatics, actinomycosis, acute osteomyelitis of the jaw, pulmonary lesions as well as disturbances of the digestive tract?

By sparing the child the necessity of thoroughly masticating the foods, by reason of a too thorough preparation and cooking, as well as feeding the refined foods as are now found in the ordinary channels of commerce, it will bring about immediate and remote deleterious influences. The immediate influences arising from the lack of detergent properties possessed by bread made from the "new process flour." Remote in as much as such lack of detergent properties sentences the tooth to the forceps.

To properly care for the teeth of the child, attention should be given to the food of the expectant mother at the earliest discovery of conception. It is very important at this time to provide a well-balanced ration, in the sense that the ration should supply more of the food elements than is required for the body maintenance under ordinary conditions.

The food requirement of the woman and child is greater than that of the healthy man of equal energy and protein requirement. For the woman, because of the functions of menstruation, pregnancy and lactation, and in the child to provide for growth and development. This fact is well illustrated in the need for iron. Thus a woman requiring eight-tenths as much food as a man, will probably require more than eight-tenths as much iron; and a child requiring half as much food will easily require more than half as much iron. These conditions in women and children may be reasonably expected to affect the demand for iron to an even greater extent than they affect the requirement for total food.

It is probable that menstruation, pregnancy and lactation increase the iron requirement of the mother by at least three milligrams per diam.

A study of the chemical analysis of tooth structure will enable us to familiarize ourselves with the food requirement, not only of the pregnant woman, but also the growing child and male adult.

Let us take up three of the four parts composing the teeth, namely, enamel, dentin and cementum.

The enamel, normally the visible portion, has been likened unto a coat of mail supplied by nature to protect the dentin.

Three analyses by two different chemists give the following results:—

		Von Bibro.	
		Male.	Female.
Calcium phosphate	85.3	89.82 (inc. fluor.)	81.63
" carbonate	8.0	4.37	8.88
" fluoride	3.2		
Magnesium phosphate ..	1.5	1.34	2.55
Sodium	1.0	.88	.97
Keratin and H_2O	1.0	3.59	5.97

The next portion, or dentin, comprising the greater portion of the crown, according to Berzelius, is composed of:—

Calcium phosphate	62.00
“ carbonate	5.50
“ fluoride	2.00
Magnesium phosphate	1.00
Sodium salts	1.50
Collogen and H_2O	28.00

In this structure we find a very great increase in the organic elements, varying in the case of the enamel in organic matter between 1 and 5.97 per cent., and in the inorganic matter between 94.03 to 99. In dentin we have 28 per cent. organic and 72 per cent. inorganic.

The cementum, or root, consists of the following:—

Calcium phosphate and fluoride	58.73
“ carbonate	7.22
Magnesium phosphate	0.99
Salts	0.82
Collogen	31.31

Here we observe a still greater organic content, being 31.31 per cent.

Gassmann gives a more recent analysis, but of the mixed tooth substance, of prehistoric and of modern.

	Deciduous.	Cuspid.	Wisdom.	60 yr. old.	Prehist.
HO	8.76	8.09	6.75	8.27	8.46
Organic by combustion	22.84	22.2	18.33	21.42	24.90
Calcium	29.59	29.78	31.65	30.25	29.94
Magnesium	.78	.87	.80	.82	.28
Phosphorus	40.64	40.98	41.48	41.10	39.00
CO_3	4.12	4.18	5.29	4.32	4.07
Clorine	.37	.41	.4	.24	.34
Potassium	.35	.34	.33	.27	.32
Sodium	.54	.61	.67	.61	.68

Thus the elements revealed in the analysis by Gassmann, in addition to the elements H. N. S. O. and Fe contained in protein, are the ones necessary to meet the body requirements.

There are, however, notable factors to be given to food stuffs other than the elements just mentioned, whilst not an intimate part, they bear a very important relation to the nutritive value of foods. These factors—digestibility, appetite and palatability—are so inter-related, and rest upon so fundamental a basis, that due consideration must be given them.

Whilst palatability has a bearing upon digestibility, the reverse is not necessarily true, for human beings and animals show fondness for kinds of foods that are indigestible or worse.

Also important is the fact that desire, appetite and digestion are not the same with any given individual at all times and under all circumstances.

Gastric secretions are freest and strongest with foods that are liked best. Food given in small quantities calls forth stronger juices than when larger quantities are given.

A very important factor in considering the diet is the fact that certain proportions of food consumed are lost in each step in their progress through the body; and a considerable part of the value of the food is required to carry on the work of mastication, digestion and metabolism, leaving a relatively small proportion ultimately available for tissue building and external work.

The comparatively small organic content in tooth structure will necessarily lead us to place greater emphasis on the demand of the body for the inorganic salts or elements contained therein.

Our foods are divided into four divisions, namely, proteins, carbohydrates, fats, mineral matter or ash, the protein supplying the greatest number of elements. They are essentially combinations of A-amino acids and their derivatives. They are formed by plants, the animal organism appropriating them through digestive processes and forming the characteristic constituents of the tissues and fluids of the body, and constitute nearly all of the nitrogenous material involved in nutrition. They differ in their solubility in water, salt solutions and alcohol.

The nature of protein is also important, particularly so in pregnancy and lactation, as well as the growing child. No less important is it that the food shall furnish along with the protein proper amounts of the so-called ash constituents. Protein can be converted into fats and carbohydrates upon the splitting of the N. from the protein molecule.

Von Noorden says, "The importance of protein must not be overestimated. A diet is not necessarily good because the amount of protein is right; it must have the proper proportions of the non-nitrogenous nutrients as well, since the protein is not to be depended upon for the necessary fuel value.

Kellner points out the fact that animals cannot survive a nitrogen-free diet, or, in other words, a purely fat and carbohydrate diet, much longer than with an entire absence of all food, due to the constant waste of nitrogen through katabolic processes. Fats and carbohydrates protect the protein in the body to some extent from oxidation. Hence nitrogen waste does not keep pace with nitrogen supply, though in some measure dependent upon it.

Carbohydrates have a greater protein saving power than fat, though fats produce over twice as much energy when carbohydrates are not supplied, the body forming the necessary glucose by decomposing the protein. Carbohydrates can be formed from fats in the body with great difficulty.

Since the analysis of tooth structure has shown us a greater proportion of inorganic matter, let us consider the foods and parts of them necessary to supply the demand for these elements. For them we must look to the ash of food stuffs.

Among some of the most common of food stuffs wherein are found all of the inorganic elements in the form of compounds, such as CaO, MgO, K_2O. Na_2O, P_2O_5, also the elements Cl, S, Fe, are:—

Fruits, such as apples, bananas, fresh currants, grapes, lemons, muskmelons, oranges, peaches, prunes; and the following lacking one or more of the elements or compounds:—

Apricots	do	not	contain	S and Fe.
Blackberries	"	"	"	Na_2O, Cl, S and Fe.
Cherries	"	"	"	S.
Citron	does	"	"	S and Fe.
Cocoanut	"	"	"	S and Fe.
Cranberries	do	"	"	Cl.
Dates	"	"	"	MgO, K_2O, Na_2O, Cl, S.
Figs	"	"	"	S.
Gooseberries	"	"	"	S and Fe.
Limes	"	"	"	Na_2O, S.
Olives	"	"	"	S.
Pears	"	"	"	Cl, S.
Plums	"	"	"	S.
Pumpkins	"	"	"	Fe.
Raspberries	"	"	"	Na_2O, Cl, S, and Fe.
Rhubarb	does	"	"	S and Fe.

Vegetables containing all: Beans, beets, cabbage, carrots, celery, corn, lettuce, potatoes, onions, peas, spinach, squash, tomatoes and turnips.

Those lacking one or more elements or compounds:—

Stringbeans	do not contain	Cl.
Cauliflower	does " "	Fe.
Cucumbers	do " "	Fe.
Dandelion	does " "	Any but Fe.
Endive	lacks	Cl, Fe.
Lentils	lack	S, Fe.
Parsnips	"	S.
Sweet potatoes	"	S.
Rutabagas	"	Cl, S, Fe.
Salsify	lacks	Ca_2O, MgO, K_2O, Na_2O, Cl.

Cereals containing all: Whole barley, whole wheat, oatmeal, rice, rye.

Cereals or products lacking one or more elements or compounds:—

Buckwheat flour	lacks	S, Fe.
Flaxseed	"	Cl, Fe.
Rye flour	"	Cl, Fe and S.
Wheat flour, low grade,	"	Na_2O, Cl, S, Fe.
Wheat bran	"	Cl, Fe.

Meats containing all: Lean beef.

Those lacking one or more:—

Veal	lacks	Fe.
Ox tongue	"	Cl, S, Fe.
Chicken	"	Fe.
Pork, lean	"	Fe.
Ham	"	K_2O, Na_2O, P_2O_5, Cl, S, Fe.

There are no fish containing all.

Those lacking one or more, viz:—

Cod fish	lacks	S.
Haddock	"	Fe.
Halibut	"	K_2O, Na_2O, Cl, S.
Herring	"	K_2O, Na_2O, Cl, Fe.
Pike	"	Fe.
Salmon	"	S.

Nuts containing all: Almonds, peanuts.

Other foods containing all: Milk, eggs (whites and yolk), cream.

Experiments have shown that during starvation considerable quantities of Ca. and Mg. are excreted in the urine and feces, representing chiefly the waste products of bone and teeth.

It is now firmly established that these elements in the form of salts are not only necessary to the hard tissue, but also numerous soft tissues, including the blood, which contains considerable amounts of calcium salts.

In the *Deutsche Revue* for July, 1912, Rudolph Emmerich and Oskar Loew recommend and insistently urge the addition of calcium salts, preferably calcium chloride, to the daily diet, in amounts of not less than 1½ grams. They support this contention by a great number of properly controlled experiments. They also point out that sodium chloride, sodium bicarbonate and sodium phosphate are very important blood salts. Potassium and magnesium phosphate play an important part in all of the cells composing muscle, glands, nerves, bones and teeth.

According to Röse, organic compounds of Ca. are essential elements of all the cells; and within the cells are always found in the nucleus. The calcium content increases in proportion to the size of the cell nucleus in the organs. He states that meat, bread and potatoes are usually poor in lime, though well supplied with K, Mg. and P. Liver and kidney are particularly rich in Ca. salts. Leaf vegetables are better than root vegetables. They contain from 10 per cent. to 20 per cent. of mineral matter in the ash, or from eight to fifteen times as much as meat, bread or fruit.

In limestone countries the water is better, although the percentage, 0.1 gram per liter, is insufficient.

Röse has shown that the lime content of soil and water has a marked influence in making teeth of a superior quality. It also has a beneficial effect upon the lactation period.

Aron observed that where food is deficient in lime, the fetus draws this indispensable element from the parent organism.

This lack of calcium, as you all know, is responsible for the development of rickets. He also agrees with other observers, that from one to 1 to 1½ grams of lime should be assimilated daily to maintain the balance.

Cow's milk contains calcium in combination as di-calcium phosphate, 7.42 parts; tri-calcium phosphate, 8.90 parts; calcium citrate, 23.55 parts per hundred of ash, thus being a very good substitute in districts where foods are poor in mineral salts.

Röse has found the most perfect teeth in localities where, beside calcium, magnesium was found in the water in the proportion of 4 to 1. The permanent hardness of water is the important quality. Nitric waters, because of their Mg. content, are best for cooking vegetables, since they tend less to extract their mineral contents. He also observes that the color of teeth is indicative of the Ca. and Mg. content. Those of a fine light yellow or yellowish color are found in inhabitants of districts rich in mineral salts; the bluish or bluish-gray denoting the reverse.

With increased cultural refinement there is a lack of mineral salts in the nutrition. The so-called organic mineral salt preparations on the market cannot take the place of the natural food, such as cheese, milk, eggs, green vegetables, leguminous food and natural mineral waters.

Phosphorus is retained by the organism more eagerly than any other substance. It is widely distributed in the human body, and combined in greater proportions than Ca. It is a component of the cell nucleus, and of the blood. In the blood, the phosphates are of the highest importance in maintaining its alkalinity. Along with N. and K. it is the most essential element of plant food.

We have thus far discussed the most important elements of feeding in relation to the teeth by the metabolic route. It is equally important that we consider the direct influence of foods upon the teeth by mechanical action and chemical change.

The mechanical factors involved are of a most important character, since the injurious results of chemical change can be greatly ameliorated by careful observance of this quality in food.

The habit of this day in ending a meal with the partaking of a carbohydrate, unless mechanical means be immediately employed for its removal, is fraught with the disaster that is our daily clinical observance. To assist in accomplishing the removal of these carbohydrates, which are admittedly very essential to the economy, it is necessary to practice thorough mastication of a food that has a decided detergent quality, and in which chemical changes do not react acid. For this purpose it might be suggested that the meal be ended by the consumption of a piece of meat or a leguminous food.

The deleterious influence of foods is assisted by several factors as contributing causes. The relation of the teeth to each other within the arch, by reason of the degree of contour of the approximal surfaces. These, an attempt has been made to illustrate on the chart. A flatter surface permitting a closer adaptation and greater surface to be acted upon by the acids resulting from the fermentation of the carbohydrates or free acids taken with the food. Fissures on the masticating surfaces of the teeth, wherein the enamel has not united, and food collects and cannot be removed by means readily applied by the individual. Small pits or cracks likewise afford a lodgment.

Susceptibility also plays an important part, though as yet little understood.

Dr. J. Sim Wallace, in a paper published in the *Proceedings of the Royal Society of Medicine,* states that "bread should not be soaked in milk before eating, as it loses its detergent property, also its power to stimulate the flow of saliva. Bread and marmalade, bread and jam, also lessen the detergent property of bread.

Miller describes dental decay as "a chemico-parasitical process, consisting of two distinctly marked stages—decalcification, or softening of the tissue, and dissolution of the softened residue. In case of the enamel, however, the second stage is practically wanting, the decalcification signifying its total destruction."

The fermentation of the carbohydrates in our food, and the resultant lactic acid formation, is the chief exciting cause of caries. This lactic acid, even in dilute form, speedily decalcifies tooth tissue. Miller considers starchy foods more detrimental to the teeth than sugar, which, because of its ready solubility, is rapidly carried away, or so diluted by the saliva as to be rendered harmless, whereas the former adheres to the teeth for a greater length of time and thereby exerts a more continuous action.

Fermentable albuminous foods mixed with saliva develop but small quantities of acid, which soon disappear. They are not injurious to the teeth, even though retained for a length of time.

Albuminous food, in undergoing putrefaction in the mouth, produces an alkaline reaction, therefore harmless to tooth structure.

An excess of sour fruit, grapes, lemons, etc., and the continued use of acids or acid compounds, has a decalcifying action on the teeth, attacking, however, the exposed surfaces.

DENTAL PROPHYLAXIS.*

BY P. B. McCULLOUGH, D.D.S.,

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Under this title is to be considered the prevention of diseases of children's teeth, specifically dental caries.

Modern thought on this subject justifies the belief that in isolated cases under intelligent direction, chiefly as to the food habit, caries can be prevented; but considered as regards the multitude, the prevention of dental caries, in my judgment, is impossible.

I shall, therefore, amend the title of this paper to read:—

"The Prevention of the Consequences of Dental Caries, Not its Incipiency."

Dental caries is caused by the solvent action of lactic acid fermentation. Susceptibility, or immunity, is as the oral fluids are favorable or unfavorable media for the acid-producing bacteria. The saliva is a product of nutrition, so that the lack of balance in a carbohydrate and proteid diet is fundamentally a cause. It, therefore, will be seen that we are called upon to combat a disease which, for sociologic and physiologic reasons, is not preventable.

The consequence of carious teeth on the general health is common knowledge, the popular idea being that the food is contaminated and toxemia occurs by way of the alimentary canal. No one will deny that this channel of infection is to be guarded against, yet constitutional involvement by this medium is very hard to prove, while cases without number are in constant evidence of toxic signs of direct absorption from abscessed teeth.

Glandular involvement on the diseased side, from the submaxillary to the axillary glands, is a common consequence; septicemia and deaths with unmistakable etiology are recorded.

Signs of impaired general health from carious teeth are not easily discernible until infection penetrates the root, involving surrounding tissue, resulting in abscess.

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* Read before the Philadelphia Pediatric Society, December 10, 1912.

Another very frequent expression of this disease is seen in a fistula discharging on the face at the angle of the lower jaw; referred very often to our public dispensary after treatment has failed through neglect to diagnose a putrescent pulp in a lower first permanent molar as the cause.

Susceptibility to dental caries is greatest during childhood; after complete puberty average man in good health is practically immune. After middle life impaired function is expressed by susceptibility of the pericementum to disease, clinical evidence being atrophy with or without the concomitant chain of inflammatory phenomena; so that in childhood the teeth are lost as the result of decalcification, and in age by exfoliation from failure of the pericemental membrane.

The neglect of the teeth in childhood not only makes necessary the repeated reparative measures and artificial substitution required in middle life, but is manifest in age by the earlier involvement of the pericemental membrane, chiefly due to the loss of the mechanical support which each tooth affords its neighbor in maintaining normal occlusion.

Dental caries is controllable by dental operations and by this method only. The mechanical cleaning of the mouth is of value in reducing the number of pathogenic bacteria, and for this reason a valuable precautionary measure to be observed for the sake of the general health. The use of the tooth brush is to be insisted upon because such practice induces a beneficial moral influence in encouraging other sanitary habits; but as a preventive of dental caries it fails for two reasons—first, because the disease is a manifestation of a constitutional predisposition, and, secondly, because of structural imperfections in development.

As the result of an examination of 3,236 school children, from seven to fourteen years of age, made in this city in 1911, 5,575 first permanent molars erupting at six years of age were found lost or decayed, 976 second molars erupting at twelve years, and 1,212 other permanent teeth decayed.

Observations made at the time proved that in mouths where no brush was used teeth free from decay were clean; that where decay existed and the brush was used the teeth were dirty on surfaces not involved by decay.

This proves that the brush is not as effective in keeping the teeth clean as is their use; that in the first case evidence of its lack of use was not apparent, and in the second case its use was not effective.

The sum of this is that the brush in children has a sanitary value to be encouraged, but that mastication is a greater cleansing agent, that filling is the only remedy to restore masticatory efficiency.

Dental prophylaxis, therefore, is most effective in childhood and consists in preventing and curing abscesses on the temporary teeth, in preventing irregularity of the permanent teeth by preventing the premature loss of the temporary ones, and in remedying structural imperfections in the permanent teeth.

The value of this service is measured in the prevention of constitutional diseases, of a channel of access to the lymphatics for the tubercle bacilli, of impaired physical and mental efficiency, and the endless variety of artificial substitution made necessary throughout life because of neglect of care during the elementary school age.

The Cutaneous (Luetin) Reaction in Syphilis.—There is, in the *Bulletin of the Johns Hopkins Hospital* for August 1912, a paper of the first importance by Wolfsohn, giving a complete analysis of a series of cases in which this reaction was employed, using the strict Noguchi method. (See *Universal Medical* Record, February, 1912, p. 164.) The author concludes, as do others (*vide supra*), that the reaction is specific for syphilis, and has its greatest value in the latent and tertiary stages, while it is positive in some secondary treated cases. In parasyphilitics with cardiovascular manifestations the reaction may be delayed for some days. The test is helpful in the diagnosis of latent syphilis in pregnancy. A point of exceeding interest is the state of "Umstimmung" that exists in the tertiary and latent forms of syphilis. That is to say, in many cases of such forms the site of the control injection shows almost as marked a reaction as does the site of the luetin injection. But in control *patients* there is no reaction on the side in which the control emulsion is injected. The point is, of course, that, late in the disease, the skin of syphilitics is susceptible to trauma.—*Universal Medical Record.*

RELATION BETWEEN ABNORMAL BREATHING AND MALOCCLUSION.

BY S. MERRILL WEEKS, D.D.S.

It was with trepidation and pleasure that I accepted your invitation to present for your consideration some of the relations existing between abnormal breathing and those conditions which the orthodontist may justly consider his field of operation. The pleasure to me largely comes from the fact that every meeting of this kind is indicative of a growing interest among the medical profession in these factors. The orthodontist has felt keenly the necessity for this coöperation, and for many years has consistently enlisted the assistance of the medical specialists in his treatment of a certain class of cases.

It is the belief of the orthodontist that much good would be derived by a more concerted support from our medical friends. How little this has been you will appreciate by a reference to text books and society literature in which this support, so far as I have been able to observe, is conspicuous by its absence. I believe your experience will cause you to agree with me that there is need of coöperation among those men who have to do with the parts of the human anatomy which are so closely related to the teeth.

I will state that 60 per cent. of all the cases that come to me for orthodontic treatment are, or have been, at some time afflicted with nasal obstruction to the extent of causing habitual breathing through the mouth. Again, of a certain clearly defined class of cases recognized by orthodontists, 95 per cent. are associated with mouth breathing.

I can, perhaps, do no better at this time than to define as briefly as I am able the characteristics of those cases to which I have alluded. The dental arch is narrow in its lateral aspect and correspondingly protruding anteriorly; the anterior teeth are thus caused to take a more or less horizontal position, thereby preventing the lips from being closed. The palatal arch also would indicate a lack of lateral development of the entire maxillary bones and a corresponding lack of breadth to the lateral walls of the nasal tract.

The palatal arch also is narrow, and correspondingly higher in its vertical position. This would seem to restrict the area of the nasal tract by shortening the vertical dimensions and deflecting the septum. I believe it is on record that nearly all such cases are associated with septum deviations. The lower arch is usually wider than the upper. The anterior teeth are in supereruption, while the entire dental arch or the amandible is posterior to its normal relation with the upper arch.

If we preclude more than a reference to the relation of the lower arch in these cases, our subject narrows down very largely to a consideration of the development of bones supporting the teeth of the superior arch and of the bones which may be influenced through the medium of the teeth.

With the orthodontist, all tooth conditions to be considered resolve themselves into phases of development. All etiologic factors are those of development, as are also those of treatment, and our results would be very meagre could we not expect nature to work hand in hand with us and thus finally bring about a physiologic balance.

In the matter of development, I believe you gentlemen of the medical profession are like the orthodontist—concerned with two points of view, namely, lack of development and abnormal development; and that all cases should be considered under one of these two heads or a combination of both. It is, to be sure, difficult to clearly estimate these several features as it is with all of the problems with which we have to deal; but if everyone whose work is associated with these parts will observe, compare and record we shall finally, with the assistance of each other, arrive at satisfactory conclusions.

By far the largest majority of these cases of malposition of the teeth which the orthodontist has to treat are those which have to do with underdevelopment and just how much the cases of under-development may be considered factors in the cause of those cases of nasal malformation it is hard to say. It has been, and perhaps still is, a much mooted question as to whether the dental conditions are predisposing causes of nose and throat deflection or *vice versa,* and we are not doing our best for humanity until we can better define these relations. I believe it is the general belief among orthodontists that the nose and throat are the first to present abnormal conditions, and that the deviations in the dental field are the result.

There have been so many theories advanced as to the manner in which the causes operate to bring about a disturbance in the dental organism as to make it impracticable to take them up in detail, but I wish to impress upon your attention the thought brought out by my confrere, Dr. Stathers, that the normal position of the dental arch expresses the point, or points, at which all of the forces acting upon the teeth are in a state of equilibrium, and that the removal or change of any one of these forces will change the final result and be expressed by an abnormal denture. Therefore, every normal denture is indicative of abnormal forces having existed or now existing. There was a time when the orthodontist was concerned principally with the correction of dental irregularities, but I am sure that the majority of us now feel that the understanding of etiologic factors are far more important, not only in bringing us to a position where we may assist in the prevention of abnormal developments, but to enable us to better treat such cases.

It is probably true that these several factors act as a vicious circle in which the cause and effect intermingle to such an extent as to make a concise estimate of the relations impossible. For that reason it seems to me much more important that we clearly establish the initial cause. For instance, we ought to determine whether mouth breathing is instrumental in preventing the dental arch from developing properly or if the under-developed arch is the predisposing cause of those conditions which make mouth-breathing necessary.

It is a fact that uncivilized races have a far better developed dental arch and less malpositioned teeth than the civilized races. It is also well known that their foods are more in their natural state, requiring much more mastication than the foods of civilized races. We all know that our foods are so well prepared as to require little or no exercise of the teeth to prepare them for deglutition and that it is very hard to masticate food where mastication is not required.

For these reasons I feel safe in saying that lack of use of the teeth is one of the large causes of under-development of the dental arches and also of the bones immediately surrounding. While I am of this opinion, I feel like asking our medical friends if they could not treat tendency of children to constipation by advocating better mastication rather than prescribing premasticated foods, for in the young child the liking for soft foods is easily acquired, and soon becomes a habit that continues through life, while, on the other hand, I know that if the child could early form the habit of deriving pleasure from much mastication the effect upon the developing arch would be most beneficial.

It has been suggested that adenoid vegetations and tonsillar enlargements make such a draft upon the nutritive supply as to interfere with the nourishment necessary to properly develop the bone structure of the near surrounding parts. Again, that the pressure brought about by these factors prevents the proper circulation of the blood and a corresponding lack of nutrition.

It has seemed to me, also, that the act of mouth-breathing, by taking to the lungs air containing more dust and of a lower temperature than nature intended has a tendency to reduce the vitality of the individual, thereby interfering with the general development, and thus the parts of which we are speaking would suffer correspondingly. These are not all of the factors of development which might be mentioned, but some of those in which we shall find, I hope, a common interest.

It is necessary that we should be no less interested in abnormal developments than in under-developments.

I do not believe we can consistently leave this subject without some reference being made to the matter of treatment. As I stated earlier, the orthodontist would not feel that he could treat a case associated with mouth-breathing and bring it to a successful and permanent conclusion without the coöperation of the rhinologist in removing adenoids and enlarged tonsils, etc., nor could he successfully treat any case in which the patient was below normal in vital activities without the assistance of the physician to restore normal functional relations. I also believe that the rhinologists will not be satisfactorily successful until the dental apparatus is so corrected as to make it possible for the patient to close the lips without conscious effort.

By far the greater number of our problems have to do with the relation existing between mechanical forces in the way of producing stimulus and bone development. There was a time when bone was considered just bone and that was all. The tendency has been for the past few years, and there seems to be good reasons, for us to look upon bone as a much more active medium, and as this principle has taken root it has helped to explain many problems before perplexing to us, and to open up for our exploration larger and more significant fields. Dr. Stathers made reference to this phase, and to get it more thoroughly impressed I can do no better than to quote from the paper prepared by Dr. Frederic B. Noyes, of Chicago: "The jaws are endomembranes in their origin, but very early in their development a periosteum is found over the surface of the bone already formed, and from that time on the growth of the bone as an organ is through the functions of the periosteum, together with the articular cartileges and the peridental membranes. By these conditions the bone is built up, but by the periosteum the surfaces are modeled into form, and by the osteogenic tissues enclosed within the surfaces of the bone, the internal structures are constantly being rebuilt, so as to adapt the organ to the forces to which it is subjected with the least possible might. The more carefully this is studied the more evident it becomes that bone is formed and removed in response to mechanical stimuli, and that the entire surface is arranged in harmony with the mechanical stresses which result from the forces applied to the teeth and the surface of the bone."

This fact is being made the basis of much of the work done in tooth relations, and the results are in keeping with that interpretation.

If this be true then there is no reason to believe that we could not expect to apply the same principle to a consideration of those parts associated with, and influencing, mouth-breathing. Again, in a further study, I believe we should include a consideration of the sutures of the bones of the face and by a proper adaptation of forces we may so influence these sutures in their development as to bring about an increased capacity of the breathing tracts. I base my conclusions on the supposition that in a majority of cases of adenoids they are associated with a restricted breathing space and that insufficient breathing space is predisposing to the recurrence of adenoids and associated pathologic conditions, and that anything that we could do to give an increased breathing area would be beneficial.

We must admit that until recently, and to some extent even now, the character of the work done in moving teeth has been such as to be detrimental rather than beneficial to the nasal tract and associated parts. For instance, when the work in expanding the arch was such as to tip the teeth, the crown outward and the apex of the root corresponding inward, the effect was to contract those bones forming the nasal air passages; but with the better understanding of the conditions and the adaptation of appliances whereby we can move the roots out as much, or even more, than we do the crowns of the teeth, we bring about altogether a different effect.

In concluding, let me impress on you that the age element is an important one. Dr. Noyes makes the statement that these tissue changes are taking place during the entire life of the individual, but it is manifestly true that it is many times more rapid during the normal period of development; and to get anything like a satisfactory result we must have the coöperation of nature during its more active period.

THE TREATMENT OF SCARLET FEVER WITH MOSER'S SERUM.—B. Schick (*Therap. Monats.*) lays down the following principles that should govern this method of treatment: (1) The treatment should be applied only to those cases of doubtful prognosis and to those ordinarily fatal. (2) The injections should be made as early as possible, preferably during the first two days of the disease. The third day decides whether the treatment will be successful or not. After the fifth day of the disease the serum has no effect. (3) Cases most suitable for the treatment are those with toxic scarlet fever and those in which the throat complications are absent or are markedly developed. (4) Only those sera should be employed whose efficiency has been demonstrated. (5) The amount of serum to be injected is 200 c.c. In children up to one and a half years of age the amount should be 100 c.c. (6) All other therapeutic measures should not be omitted, especially all those that are designed to save the heart. Moser's serum is the only remedy of value in the toxic cases of scarlet fever. In these cases one should inject the serum not as a last resort, but early in the course of the disease.—*Medical Record.*

SOCIETY REPORTS.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, November 14, 1912.

WILLIAM SHANNON, M.D., CHAIRMAN.

The following papers were read:—

THE RELATION TO, AND INFLUENCE UPON, RESPIRATION DURING CHILDHOOD OF NORMAL AND ABNORMAL DENTAL ARCHES. By Dr. Arthur Zentler (see p. 25), and

THE SURGICAL ANATOMY, DIAGNOSIS AND TREATMENT OF INFLAMMATORY INFECTIONS OF THE NASAL ACCESSORY SINUSES IN CHILDREN. By Dr. Seymour Oppenheimer. (See p. 4.)

DISCUSSION.

DR. JOHN MCCOY said that accessory sinus disease in children was more common than was generally supposed, occurring frequently but not diagnosed. In speaking of the etiology of the condition he laid great stress on adenoids. They were not only a focus of infection, but produced swelling of the tissues of the nose, and, indirectly, deviated septum, while these conditions in turn caused deficient drainage from the nose. When Dr. McCoy operates on a child of ten years or over for adenoids he tells them that the child will probably have to have some of the hypertrophied turbinate tissue removed as well as to have the palatal arch corrected by a dentist.

The acute infectious diseases are a frequent cause of accessory sinus disease in children. In very young children the only symptom would be a mucopurulent nasal discharge. In older children, this would be associated with pain. A careful X-ray plate would be of great value in determining the exact location of the sinusitis. Ninety-five per cent. of the acute cases might be cured by rest in bed, attention to diet, laxatives and adrenalin spray. In chronic cases the main question was one of drainage, and any obstruction to drainage from the frontal, ethmoid or sphenoid region must be removed, first the adenoid and then usually hypertrophied middle turbinate or deviated septum. Occasionally an external radical operation must be resorted to.

Dr. Percy Fridenberg said that the ophthalmologic surgeon was confronted with cases presenting ocular and orbital conditions which might be due to suppuration in one or more accessory sinuses. It was just as important, for diagnostic purposes, to exclude such involvement of the sinuses. The possibilities of ocular and orbital involvement were accentuated in small children and infants by the large size of the eye socket as compared with the rest of the face, the consequent intimate spacial relations with the neighboring sinuses, and the extreme richness and complexity of the vascular communications. There was, fortunately, safety in the smallness of the sinuses in children and their comparatively free drainage into the unobstructed nasal passage, and the fact that there had not been sufficient time for chronic inflammation with the resultant changes in the mucosa, causing obstructive growths, or of bone disease. Etiologically, it seemed probable that some forms of intestinal infection, notably the forms due to the colon bacillus, might be a cause of nasal suppuration, and this generally meant infection of one or more sinuses. The rôle of adenoids in these cases was not to be denied. The mere mechanical obstruction causing in turn turbinate swelling, venous engorgement in the pharynx, sphenomaxillary and pterygoid regions, was sufficient to bring about a decided disturbance of orbital circulation and produce exophthalmus or edema of the lids. Thus in a case recently seen the symptom of intermittent protrusion of the globe coming on in the morning and growing less during the day in an infant with some bloody pus discharge from one nostril has caused suspicion of accessory sinus suppuration. The latter was excluded by careful examination and scraping away of the obstructing adenoid mass, after which, under mild treatment, the symptoms cleared up. In several other cases in older children the pain of accessory sinus disease was simulated by syphilitic periostitis or osteomyelitis of the frontal, superior maxillary, or nasal bones. This specific disease, as well as tuberculosis, should always be borne in mind. In the case of strumous children the constitutional treatment should be considered. The oculist not infrequently saw newly-born children with edema of the lids, exophthalmus, or localized swelling about the orbit. All of these might be symptoms of accessory sinus disease, but they might also be due to widely different causes. The gonococcus infection might travel up from the nose and infect the lachrymal sac and conjunctiva, and in all cases of blennorrhea of the newborn the treatment of nasal involvement was of prime importance. Many cases of dacryocystitis and of mucocele of the sac depended on obstruction of the nose, and this was not infrequently associated with infected sinuses. In a child with protruding globe and evidence of hemorrhage into the orbit one should consider whether forceps delivery was directly to blame or whether the proptosis was a sign of orbital complication of a sinus suppuration, itself of traumatic origin. Hemorrhage into the orbit producing protrusion of the eye might be due to a number of constitutional conditions. The speaker related the history of a case of Barlow's disease and infantile scurvy in which the hemorrhage first appeared in the orbit. A localized swelling at the inner canthus might be due to disease of the tear sac or it might be a mucocele or empyema of the ethmoid cells. The former might have to be excluded by establishing the free drainage of tears into the nose, when any remaining swelling could be diagnosed. Sac swellings were usually below, mucoceles above, the inner palpebral or canthal ligament, but in very young children this was not easy to determine. Any swelling was suspicious of sinus disease, which persisted after removal of any concomitant rear passage affection. The cases cited by Dr. McCoy showed that these cases were met with by the oculist first. This explained why the pediatrist was apt to minimize their frequency. In special hospitals and eye and ear infirmaries the conditions were not infrequently seen. Where there was evident pus collection in or about the globe it was not wise to make incisions through the lids. The greatest aid to this treatment was early diagnosis, and this depended on careful, prompt and frequent examinations. Routine inspection of the nares in children should be as much a routine measure as examination of the ears. If this were the case we should not be told that these affections were rare. The same thing was said years ago about otitis. Nasal discharge was too frequently taken as a matter of course; it not infrequently meant sinus involvement, which often took care of itself, but which should not be overlooked or ignored.

Dr. Ernest Danziger said that it was true that adenoids tended toward the formation of a high palate, and the high palate tended in turn to deviation of the septum, hence children with adenoids would be more exposed to the continuance of acute sinus disease. If they considered that hypertrophy of the lymphoid structure in the pharynx represented a physiologic attempt to protect the body against systemic infection from the highly vulnerable mucous membranes of the upper air passages, they would readily see that children with a tuberculous or luetic taint gave all the factors for the production of such chronic infectious conditions. General hygienic, dietetic, or specific treatment was as important as local remedies or mechanical prevention.

Dr. Edward A. Bogue said that he wished to discuss the relation or the influence of respiration during childhood on the normality, or abnormality, of the dental arches. Much had been said regarding adenoids and little had been said regarding the age at which operation should be performed. Adenoids, if carefully looked for, were often noticed before the first year of life, they interfered mechanically with respiration of the child, and the result was that the lungs had not a chance to develop fully and, as a result, the thorax did not develop fully. All this was coincident with the faulty dental arches. The vault of the mouth was not fully developed. Opening the mouth to breathe and with the tongue withdrawn from the roof of the mouth, where it should remain, caused the trouble. This occurred in cases of children afflicted with adenoids. The presence of the adenoids caused open mouths and air-borne diseases, inhalations of infectious material into the lungs. A large proportion of mouth-breathers were prone to have children's diseases, while others were not. It seemed to Dr. Bogue that it was within the province of the pediatrists to watch for adenoids; if they were not removed until the tenth year, or later, the mouth did not close and further treatment was necessitated. The orthodontist, then, is the only resort. If these patients have passed six years of age the conditions are much better.

Dr. Godfrey R. Pisek said they were fortunate to hear from the other side. It too often happened that the specialist emphasized only his point of view, and now was the time to take a broad view. He believed that most of the children suffering from sinusitis came to the general practitioner or the pediatrist first. If one went over the records of dispensaries it would be found that this diagnosis was rarely made. They rarely saw these cases of sinusitis and he believed that they were uncommon. On the other hand, when they did meet with them the diagnosis was either easily made or was very much obscured. In the obscure types these cases were treated as possible cases of typhoid fever or incipient meningitis. It was essential that they should make a differentiation in these cases by exclusion, watching with great care for any discharge that came posteriorly from one nasal orifice, and they should take note of any pain in the frontal sinus, for it was often that by such aid only a diagnosis could be made.

With regard to defective dental arches, Dr. Pisek thought they should not harp too much on adenoids as the only cause for this condition, because there were certainly other factors in its etiology. There was the nutritional influence, environment, such as the sucking of false nipples, pacifiers, all causing some mechanical effect upon the formation of the arch.

A very important point was the care that should be taken of the deciduous teeth, and he believed that not enough importance had been attached to this not only by physicians, but by dentists themselves. If the primary teeth were decayed it was right and proper that they should be filled.

Dr. Charles Gilmore Kerley said he realized that these infections of the accessory sinuses occurred, but at the same time he felt that these cases were comparatively infrequent. He saw only a few such cases in the course of a year. With regard to the deformities of the dental arches he felt confident that these occurred during the first eighteen months of life. Adenoids were found in the great majority of these children. The use of pacifiers, thumb-sucking and kindred habits tended to produce or establish a deformity of the vault of the pharynx. It was important to consider nutrition in connection with these conditions. Children were more liable to develop these deformities when they were in a poorly nourished condition; in these cases it would frequently be found that there was a history of inadequate feeding, and that this was responsible for the presence of adenoids. But to consider the presence of the adenoid as the sole cause of the deformity was a mistake. There were other factors besides the mechanical ones that should be taken into account.

Dr. Henry Koplik said that the papers were excellent and that what had been said about dental arches was an aid to both the pediatrist and the specialist. These deformities were found in infants *in utero*, and this congenital element was often forgotten. There were other etiologic factors that should be taken into consideration, such as rickets and other diseased conditions of the bones. Mouth-breathing was an acquired habit; the baby could not breathe through its nose and this gave rise to swallowing the tongue. It was a question in his mind whether mouth-breathing had anything to do with the formation of dental arch deformities. Abnormal conditions, such as adenoids, were rare at birth and only developed later on. Dr. Koplik did not believe that the mechanical element played such an important rôle as was ascribed to it. As to the sinus disease, there was no doubt but that many of these cases were overlooked. Many of them were discovered accidentally; he had come to this conclusion because no attempt had been made to formulate the symptoms by means of which the condition could be discovered. He had always insisted that the physicians and the surgeon should coöperate in the care and diagnosis of these patients. How many cases of diphtheria or scarlet fever came with symptoms of acute sinus or antrum disease? He remembered seeing but two in recent years and they were both in early infancy.

Dr. Francis J. Quinlan said he was inclined to think that the lymphatic tissues played a very important part in the etiology of the majority of cases. He was not convinced that he had seen many cases of sinusitis. He had made it a point to examine children who belonged to the so-called lower classes, examining them regarding their mental and physical condition, and he found that a large proportion had a discharge from the nostrils, were of an eczematous type, apparently due to some diathesis, either tuberculous or syphilitic. He found but 2 cases of sinusitis.

Dr. Frank E. Miller said that one thing that was not touched upon was the influence on, and relation to, respiration of arches, normal and abnormal, also accessory sinuses, or the consideration of voice values. The abnormal dental arch altered voice values.

Dr. Miller quoted one case of a child with monotone voice which was due to tonsillectomy under ether, where the surgeon cut off the entire posterior pillar, which gave the child of five years a hollow, low-pitched, monotone voice. As a general observation it might be well to say that tonsillectomy with a properly constructed Mackenzie would never have allowed such a result, even with the great force applied for necessary expression to oblate the tonsil, beside the removal in the manner described would not injure the capsule or the supplementary pillars, so necessary to be considered in the conservation of phonetic values. Injuries to these muscles were most serious, as they impaired and destroyed palate and tongue action in song and speech construction, as well as overtone, the tone governing articular or oral autonomy and the palate the resonantic or nasal autonomy. In adenoid removals, if the post pharyngeal wall was injured and dragged off it could be replaced and made to grow back, but should the superior constrictor muscle be injured, which was principally a swallowing muscle, the phonetic value of the upper register of the voice would be altered, as would injury to middle and inferior constrictors, if the instrument slipped too far in a hasty and powerful removal, for the constrictors were the holding caliber supports for certain ranges of voice called registers, the palatopharyngeal being their regulators.

DR. LINNÆUS E. LA FÉTRA said he had never made a diagnosis of nasal accessory sinusitis in children, and he was glad to have heard the papers calling attention to this condition. Undoubtedly many cases of persistent "colds" in the head were due to inflammation of some of the sinuses. Most of the cases, he believed, got well under conservative treatment. Adenoids should be operated on early if they produced any symptoms; he had removed them from infants as young as one week.

With regard to the development of the palate, the high-arched palate often appeared in babies but a few weeks old; in such cases there must be a congenital or hereditary factor, since there was not time enough for the adenoids to produce such a condition.

DR. WILLIAM L. CARTER said he was much interested in what Dr. Miller had said regarding the taking out of the tonsils and the effect upon the voice. Any extensive injury to the posterior pillars certainly injured the voice, and it was his opinion that in many of these operations injuries were inflicted on the posterior pillars.

Dr. Carter did not agree entirely with what was stated regarding what happened when the tonsil was removed with its capsule. He believed that when the enucleation was properly done the pillars were not injured and that the voice was not impaired, but, on the other hand, was frequently improved by such an operation.

DR. SIDNEY V. HAAS believed that high and abnormal dental arches were not in themselves a result of adenoids in most cases. There were many other factors, chiefly those pointed out by the reader of the paper. Especial stress should be laid on the statement that high dental arches might be entirely normal and were so when the "bite" was perfect.

Dr. Thomas S. Southworth emphasized the importance of looking for these cases of accessory sinus disease; if they were not borne well in mind, as well as many other conditions, like otitis media and pyelitis, for instance, they would not be discovered. As a rule, cases of accessory sinus disease were pointed out to them by the rhinologist.

Dr. Walter Lester Carr said that these vicious circles referred to could not be helped, and there was no doubt but that they today recognized more cases of sinus disease than they did formerly, and it was, in his opinion, because they were now looking for these cases.

Dr. Herman Schwarz said that in the clinic at Mount Sinai Hospital the question had been asked if these children had their noses examined carefully, and he had not yet obtained the figures which would enable him to make a satisfactory report. He would do this later. It was remarkable that nasal deformities were present without adenoids, although adenoids, he believed, had much to do with these deformities. There were a number of these cases operated upon that were not improved. If one made careful examinations one was often surprised at the deformities that existed among these children.

Dr. Eli Long said he was favorably struck with the importance of making a routine examination of these children for accessory sinus disease.

Dr. Arthur Zentler, in closing the discussion, said he had thought to guard against the impression that adenoids must be present in all cases where there were abnormal dental arches. He had just shown casts of a child's mouth where the dental arches were abnormal, although adenoids were not present and presumably never existed, and the family physician had informed him that there was a similar condition of the dental arches in the mother and in other members of the family. Who knew whether after all this was not a matter of eugenics? Who knew whether way back in the ancestry of this child the initial cause bringing about a narrowing of the dental arches was not the presence of adenoids, the narrow arches being transmitted through heredity without the initial cause? This in a way replied to the remark of Dr. Koplik that the factor of heredity was often forgotten. Dr. Koplik had said that other etiologic factors, such as rickets and other bone diseases, should not be forgotten, and with this he was in accord. He had read a paper before the American Medical Association to show that the care of the mouth of the child must begin in the mouth of the mother during pregnancy. However, if this was neglected, and because of one or other etiologic factors abnormal dental arches were present in children, they were confronted with the condition of faulty respiration, and to point out that this was the result of faulty dental arches was the purpose of the paper. Adenoids were mentioned as etiologic factors rather in a doubtful way, stating that it was not established whether they were the cause of abnormal dental arches or *vice versa,* but they were mentioned for the purpose of disproving that they alone were responsible for lack of respiration, claiming that abnormal dental arches were also responsible for this condition. While it might be true that dental arches were made *in utero,* it must not be forgotten that dental arches were not finished *in utero,* that their development went on from the time of uterine life up to the sixth year. During this time they should help Nature to correct the deformity.

The point made by Dr. Pisek that the dentist was responsible to a large extent for permitting abnormal dental arches to occur was a very good one. It was true that if the deciduous teeth were allowed to be extracted because of caries or that when filled they were not filled so as to restore contour and preserve proper occlusion, these conditions would act as etiologic factors in the lack of proper arch development.

Dr. Kerley's remark that the trouble began within the first eighteen months of life was correct, and, therefore, if adenoids were then present they should be removed, and this as early as possible.

Dr. Seymour Oppenheimer referred to the splendid work which was done by the orthodontist, and believed that other factors were frequently present which were responsible for a narrowing of the dental arch than adenoids. He felt that the orthodontist had frequently referred cases to the rhinologist in advance of his beginning the mechanical part of the work for an opinion and a possible correction of some nasal obstruction, which frequently was very slight in character and the correction of which had absolutely no influence on the dental arch, and while he did not want to deprecate the importance of proper nasal breathing in its relation to the development of the bony skull and facial expression, yet he felt the importance of the employment of nasal and nasopharyngeal surgery in many instances was unnecessary and inadvisable. He had often been astonished to note how a deflection of a nasal septum, even of considerable degree, was oftentimes overcome by the lateral spreading and widening of the maxillary arch. This was purely a mechanical proposition. The broadening of the arch allowed the septum to straighten itself as it elongated in the direction of the height of the nasal cavity. Frequently after the performance of the submucous resection of the nasal septum, the cartilage removed, while possibly markedly bowed while in position, straightened itself out after being removed, showing that the bending was often not a permanent one, but rather a septum bent by reason of great tension, which, when relieved, was immediately overcome.

As to the controversial subject of rapid or slow spreading of the dental arch that was a question on which he could not speak with authority.

With regard to the frequency of nasal accessory sinus disease in children, that depended entirely on how alert they were in its recognition. Not long ago Dr. Kerley published a valuable contribution on 127 cases of acute otitis media occurring in private practice within one year in infants. If Dr. Kerley had directed the same enthusiasm toward the examination of the nasal chamber in these cases he might have found almost as many cases of acute nasal accessory sinus inflammation among them.

The middle ear and mastoid process could be considered as one of the accessory sinus cavities, and it should be remembered that the mucous membrane lining the nasal accessory cavities was continuous with that lining eustachian tube, etc. Why, therefore, should an inflammation of the nasal passageway during the course of a coryza or infectious disease limit itself just to the nasal interior without extending into the accessory cavities lined by the extension of the mucosa? They saw a pharyngeal inflammation extend into the eustachian tube and into the middle ear with great frequency. Why, therefore, should the nasal cavities show an immunity to infection?

The response to Dr. Kerley's inquiry as to how many cases he had seen during a year, he wished to answer by a counter question: How many cases of diphtheria, measles, and other infectious diseases with nasal discharge did *he* see during the course of a year? For just as many of these cases as he sees Dr. Oppenheimer said he saw some with accessory sinus disease. Many of the cases of recurrent coryza owed their origin to a focus within the accessory cavities and probably many of the cases, with their foul-smelling crust formations and purulent discharges and atrophic mucous membranes, primarily originated as an infection of one or more of the nasal sinuses. It all came down to the question of what they were on the lookout for. One of the pediatrists here had told him that he never saw mastoiditis in infants. That was quite true until the otologists came into the wards of the hospitals. Within the past week, in examining a large number of children between the ages of six and seven, there were three in whom discharge directly from the sphenoid cavity could be demonstrated.

The only symptom noticeable was a postnasal discharge, and that only objective. Among the radiographs passed about there were 3 cases of very great development of the frontal sinuses with unilateral disease, all of three of which were under the age of ten years.

Dr. Oppenheimer said he did not wish to be construed as implying that every slight nasal discharge meant accessory sinus inflammation, but the careful routine examination of the nasal chambers of children would, he was satisfied, show a much larger proportion of subacute and latent infections than was generally considered possible.

THE RELATION OF CONVULSIONS IN INFANCY TO EPILEPSY.—Marchand (*Gaz. des Hôp.*, August 8, 1912) discusses this topic at some length, and concludes, *inter alia,* that there are convulsive states which supervene in children with hereditary tendency, without apparent provoking cause, that are not prodroma of acute illnesses, and that are not accompanied by definite ailments. Such convulsive states not infrequently recur at intervals. They are "assimilable" to idiopathic epilepsy, and may be supposed to have an anatomical substratum in the way of specific brain conditions dating from intrauterine life.—*Universal Medical Record.*

THE PHILADELPHIA PEDIATRIC SOCIETY.

December 10, 1912.

THEODORE LE BOUTILLIER, M.D., PRESIDENT.

DENTAL CONDITIONS IN CHILDREN.

The following papers were presented:—

FEEDING IN RELATION TO TEETH. By Dr. George C. Küsel. (See p. 34.)

DENTAL PROPHYLAXIS. By Dr. P. B. McCullough. (See p. 43.)

ORTHODONTIA. By Dr. Frederick R. Stathers. (To appear in the ARCHIVES for February.)

RELATION BETWEEN ABNORMAL BREATHING AND MALOCCLUSION. By Dr. S. Merrill Weeks. (See p. 46.)

DISCUSSION.

DR. D. J. MILTON MILLER, of Atlantic City, N. J., in opening the discussion, said that these interesting papers had impressed upon him the fact that milk, broths and other soft foods were not the right diet for children in their second year, as is so generally thought. Children must learn to eat wholesome food as early in the second year as possible. Meats, coarse cereals, vegetables and foods that will make them chew are necessary at this age. This sort of diet will cause sounder teeth, less narrow arched palates and fewer adenoids. Dr. Miller also had the impression that babies fed upon gruels as diluents were more likely to cut their teeth at the normal time than those fed upon milk diluted with water. He also thought that the use of thick gruels with the milk often hastened the eruption of the teeth in delayed dentition. He asked the essayists why the primary teeth should not be removed when carious and surrounded by suppurating gums. He had frequently seen children with ill health from this cause, and he had advised removal of the teeth; but the dentist had advised the contrary. Is it right that such temporary teeth should await the coming of the permanent set?

Dr. J. H. McKee showed three casts from a boy upon whom he had performed staphylorrhaphy in 1900, while Dr. Fetterolf removed his tonsils. The casts were made in 1909. The boy's growth and speech had both improved upon good dental and medical care.

Dr. S. McC. Hamill said that he had hoped that Dr. Weeks would have considered deformities of the mouth and adenoids in relationship of cause to effect, as he was fully convinced that the adenoids were not uncommonly dependent upon defective ventilation resulting from abnormalities of the bones forming the roof of the mouth and the base of the nose. He felt quite sure that such occupations as thumb-sucking produced deformities which must necessarily antedate and probably cause the adenoids. Aside from this there are a certain number of congenital deformities at the base of the skull, instances of which he had seen in making autopsies on newborn infants, which must undoubtedly lessen the capacity of the nasal passages and the nasopharyngeal space, which would in all probability interfere sufficiently with nasal breathing to cause inflammatory conditions of the lymphoid tissue of the nasopharynx. Dr. Hamill was pleased to hear Dr. Weeks say that in the presence of very marked deformities of the palatal and alveolar arches the removal of the adenoids formed only a part of the necessary treatment. He has seen many instances in which, after a thorough cleaning out of the nasopharynx, and without recurrence of the adenoids, the patient was left a mouth-breather and subject to frequently recurring attacks of rhinitis. In all of these cases there was a very marked deformity, the most striking feature of which was the high palatal arch. The correction of these deformities must be part of the treatment; there will be no relief of symptoms until this is done.

Dr. John F. Sinclair said that he was very glad Dr. Weeks had shown the Wright instrument. He had noted in a child whose first molars had just erupted, enlargement of the tonsil upon that side without any other signs of illness. This hypertrophy disappeared after the teeth had come through. Dr. Wright has seen many similar cases.

Dr. E. E. Graham discussed the possible symptomatology of normal dentition.

Dr. Le Boutillier spoke of the utility of lancing the gums and the methods of lancing.

Dr. Hamill added that he had frequently resorted to lancing, never hesitating to lance long before the tooth had approached the surface, thus frequently bringing immediate relief to what was apparently intense suffering. He had frequently seen teeth push through the resulting scar tissue without difficulty or discomfort; while, in some cases, there was apparently some pain, he had lanced the gums a second time with immediate relief. His observation led him to believe that lancing was entirely justifiable and without any detrimental influence. He desired to ask whether this view met with the approval of those who had read the papers.

Dr. Küsel said that in lancing over the incisor teeth excision of a portion of the gum may be necessary to afford relief. This is quite necessary in helping a wisdom tooth through. Over the premolars, a cross incision will be sufficient. It is best to keep the temporary teeth intact, in order to keep the dental arch intact. If suppuration cannot be cured, the tooth may be removed. It is, however, very difficult to cure an abscess on a deciduous tooth.

Dr. Stathers said that pathologic dentition was the lack of correlation between the tooth growth and tissue resorption; that the pain was not in the gum, but was the direct result of pressure of the jagged ends of the unformed, or partly formed, tooth upon the formative organ, the pulp of the tooth. Lancing is indicated to relieve this pressure. The resulting cicatricial tissue is of a poorer histologic structure and hence more easily broken down by the advancing tooth.

Dr. Weeks said that he had been much grieved at finding so many young children who refuse to eat because they have not learned to masticate. This is the result of physicians' not having given them solid food and not having insisted upon proper mastication, having allowed these children to take only liquid or semisolid foods too long. The dental function needs use: then dental arches, nasal tracts and teeth all develop together normally. Crowded arches and impacted teeth have some effect by reflex nervous action on digestion and the child's general condition. A baby cutting teeth under abnormal conditions will show the same symptoms. Expansion of the dental arches in Dr. McKee's case may have been the reason of improvement. Mastication is easier when crowded conditions are relieved.

DR. MCCULLOUGH said that he had come to regard abscess upon temporary teeth a common cause of general debility. The treatment to be desired is removal of the putrescent dental pulp, the cause of the abscess, sterilizing the root canals and their aseptic filling. As this requires skill and time, it is too often not practicable. While extraction of the tooth is commonly done, it is objectionable. To do nothing is indefensible. In the Municipal Dental Dispensary he treats these cases as follows: cuts away two-thirds of the crown, leaving a surface less favorable to the retention of decomposing food débris, exposing the open root canals to the changing fluids in the mouth. The ground surface of the tooth and the canals are washed with alcohol, dried and saturated with a 60 per cent. solution of silver nitrate. The tooth is not filled. The operation is painless and requires but a few minutes. Abscesses on teeth so treated rarely recur. Extracting the tooth is indicated when an abscess of long standing has by pericemental necrosis destroyed union between tooth, root and its socket.

THE TREATMENT OF UMBILICAL HERNIA IN INFANTS.—Smester (*Jour. de Méd. de Paris,* July 6, 1912) describes a plan of treatment that he has adopted for thirty years with great success. The hernia is reduced and the edges of the ring are approximated by the finger and thumb of the left hand, while successive strips of court plaster (*taffetas gommé*) are applied, so that a sort of pad is built up. Then, the edges of the ring having been secured, the little pad is fortified by a strip or two of diachylon (which must not, however, touch the skin) or by more court plaster. Finally, the whole construction is secured by collodium elasticum (Fr. Codex). The advantages of this little dodge are that the hernia is well retained, that the edges of the ring are approximated, that no hindrance is created to the play of the abdomen, and that the bath is not interfered with. Smester has not once in thirty years known it to fail.—*Universal Medical Record. September, 1912.*

CURRENT LITERATURE.

ABSTRACTS IN THIS NUMBER BY
DR. T. WOOD CLARKE. DR. J. S. LEOPOLD.
DR. CHARLES E. FARR. DR. WILLIAM A. MURPHY.
DR. S. FELDSTEIN. DR. C. D. MARTINETTI.
DR. ALFRED F. HESS. DR. J. F. SAMMIS.
DR. RICHARD M. SMITH.

DISEASES OF THE EYE.

HEIMANN, E. A.: SQUINT AND ITS TREATMENT IN CHILDHOOD. (*Archiv. für Kinderhk.,* Vol. LVIII., p. 72.)

Squint is caused by total or partial lack of ability to fuse the images in binocular vision. A predisposing cause is deficient muscular balance or heterophoria. Ametropia or anomaly of refraction is not an uncommon cause; likewise unilateral amblyopia. Early treatment is indicated not only out of cosmetic and economic considerations, but also on account of the danger of the development of amblyopia from disuse. Only a convergent strabismus can be benefited by non-operative treatment. The degree of hypermetropia should be determined under atropine. This should at once be corrected by constantly worn convex lenses, even in very young children. After the third or fourth year systematic exercises with the amblyoscope should be made several times a week. Operative measures should be undertaken after failure of conservative treatment, and in cases where the strabismic angle is over 15°, or there is high grade of visual defect in one eye. Where there is manifest divergent strabismus surgical measures alone are available. Advancement of one or both recti is indicated; at times also a tenotomy of the external rectus. Tenotomy without advancement is useless. S. FELDSTEIN.

SURGERY.

ROLLIER: DIRECT SUNLIGHT IN TREATMENT OF TUBERCULOSIS. (DIE SONNENBEHANDLUNG DER TUBERKULOSE.) (*Wien. klin. Woch.,* Vienna, July, 1912.)

Rollier has treated 650 patients with surgical tuberculosis at Leysin since 1903. Of these, 450 were closed cases, of whom 393 were cured and 41 improved, while 11 remained stationary, and 5 died. Of the 200 cases with open tuberculosis, 137 are cured, 29 improved, 14 stationary and 20 have died. Recrudescence after supposed cure is known in only 6 cases, 3 of whom had pulmonary tuberculosis at the time of treatment.

CHARLES E. FARR.

DE NANCREDE, CHARLES B. G.: BILATERAL CONGENITAL FISTULA OF THE LOWER LIP. (*Annals of Surgery,* September, 1912.)

De Nancrede reports two additional cases of this peculiar and exceedingly rare congenital abnormality. They occurred in members of the same family in which, moreover, the father, one brother and a sister are said to have the same deformity. The maternal grandmother had both hare lip and cleft palate, the mother a cleft palate without hare lip, while an aunt had cleft palate. Two uncles, however, had none of these deformities. The 2 cases, aged three and four respectively, one a boy, the other a girl, presented the same deformity of the lower lip, that is, a slight notch in the median line, with a depression on each side leading to a narrow fistulous tract, which admitted only a fine probe and from which only a small amount of clear mucus could be expressed. The boy also had a double hare lip and complete cleft palate, while the girl had a unilateral cleft of the lip on the right side with a complete cleft palate on the same side. The palate and upper lip defects were operated upon and cured, while the defects in the under lip were not treated. The origin of this defect is not known, but it may be due to the persistence of the slight lateral notches which are frequently seen in intrauterine life.

CHARLES E. FARR.

BARJON, F., AND JAPIOT, P.: RADIOTHERAP DE NEVUS TRAITEMENT RADIOTHÉRAPIQUE DES ANGIOMES. (*Lyon Chirurg.,* October, 1912.)

The authors have treated 70 cases of vascular nevi, in which they have used either radium or X-ray treatment. They are very much opposed to rays for the treatment of pigmented nevi, as the prolonged irritation tends to produce malignant degeneration of the growth. Here surgical excision is the preferred treatment.

In all cases the results were better in very young children, the younger the child the better the result. Flat, port wine stain nevi are very difficult to cure, radium giving the best results, although even that fails at times. The results in vascular or angiomatous nevi, on the other hand, were excellent, all being cured, and, what is, perhaps, even more important, there was a complete return to normal in the contour of the affected part. The dose at first is small and not filtered, with intervals of three or four weeks between treatments. Either radium or the X-ray seems very efficacious in this form of growth, but great care and patience must be exercised.

CHARLES E. FARR.

FRAZER, J.: RELATIVE PREVALENCE OF HUMAN AND BOVINE TYPES OF TUBERCLE BACILLI IN BONE AND JOINT TUBERCULOSIS IN CHILDREN. (*Jour. of Exper. Med.,* No. 4, October, 1912.)

As has been pointed out editorially in the ARCHIVES some time ago, bone and joint tuberculosis has been considered to be almost invariably of human origin. Hardly any of the cultures of tubercle bacilli taken from these regions have proved to be bovine in nature.

From this point of view this article of Frazer is of importance because it shows a high ratio of bovine tuberculosis. Of 67 cases examined culturally 26 were human viruses and 41 bovine, the latter, as was to be expected, being found most frequently in the younger children. The infants were all nourished on cow's milk; the older children had also obtained raw milk. Those who showed the human bacillus were found to be surrounded in their homes by persons who had active tuberculous lung disease.

This report, taken in conjunction with the well-known fact of the remarkable frequency of abdominal tuberculosis in England and Scotland, once more emphasizes the danger of milk from the point of view of tuberculosis in young children.

ALFRED F. HESS.

MAYO, CHARLES H.: SURGERY OF THE THYMUS GLAND. (*Annals of Surgery,* July, 1912, p. 77.)

Mayo comments rather severely upon our knowledge of the internal secretions and upon the widely varying results attained by different investigators, as well as the widely varying theories upon which they base their work. For 300 years the thymus and its diseases have been written about, but our real knowledge of the subject is still very meager. The real meaning of persistent thymus is still unknown, and many, if not most, of the deaths from "status lymphaticus" are due to the anesthetic, operative shock, etc. Persistent thymus is not the cause of death in exophthalmic goiter, at least in the majority of cases.

Less than 50 operations for the removal of the thymus have been performed, most of them for persistent or recurrent stridor. Olivier reports 42 with 23 cures, sepsis being the cause of death in the fatal cases. The technic of the operation is very simple, a low curved transverse incision gives ready access to the gland and the enucleation is usually very simple. Mayo reports 1 case, in a male infant of eleven months, who had suffered from birth with difficult respiration. Vomiting, coughing and cyanosis were the prominent symptoms, and there was an area of dullness over the upper part of the sternum, with a corresponding X-ray shadow. The correct diagnosis was made, and the right lobe of the thymus was removed, with marked immediate and late improvement. CHARLES E. FARR.

MEDICINE.

GOOSSENS, RUDOLPH: NERVOUS DISEASES OF CHILDREN. (ZENUWZIEKTEN BIJ KINDERN.)

Convulsions of childhood may be divided into (1) Primary, including reflex convulsions, laryngismus, stridulus, tetany and salaam convulsions. (2) Secondary, pseudotetanus and epilepsy.

Under reflex convulsions is reported a case of a baby, three weeks old, fed on undiluted cow's milk at irregular intervals, suffering with constipation. Had a number of convulsions two days after being given a cathartic and proper feeding instituted. Subsequent attacks for a considerable period were brought on by any alimentary congestion.

The second case had an interesting family history. Of 3 children by first wife—oldest died with general convulsions; second child began having them at three months, continuing at irregular intervals; at nine years was sent to an asylum for idiots; third was normal. Only child by second wife had convulsions, beginning with eighth month intermittently.

Of father's family several brothers and sisters died in infancy with convulsions. History of families of both wives negative.

Third case was a seven-weeks-old baby of mother of forty, married fifteen years and first child. With improper feeding developed a polyuria with tonic spasms, followed by oliguria, coma and death in four days.

Another one, boy of ten years, with cerebral hemiplegia since third year, developed Jacksonian epilepsy of a pronounced type.

WM. A. MURPHY.

FROST, WADE H.: ACUTE ANTERIOR POLIOMYELITIS IN NEW YORK STATE IN 1910. Passed Assistant Surgeon, United States Public Health and Marine Hospital Service. Monthly Bulletin, New York State Department of Health, July, 1911.

The research work of Flexner and Clark, Osgood and Lucas is reviewed.

No central focus was determined, but cases were more prevalent in the St. Lawrence Valley. The disease was more prevalent in small villages and in rural communities than in the larger cities. September showed the largest number of cases.

Contact with acute cases in school appeared to be an unimportant factor in the transmission of the disease. The gravity of the prognosis as regards life appears to depend upon two considerations in the distribution of the paralysis.

(1) The location of the cord lesion.—The prognosis is graver when the paralysis affects the arms alone than when it affects the legs alone. This is of course due to the proximity of the vital centers.

(2) The extent of the cord lesion.—The prognosis is more grave when both legs or both arms are affected than when only one is paralyzed.

J. F. SAMMIS.

VARIOT AND MORANCÉ: VARIATIONS, CAUSED BY DIET IN ABDOMINAL GIRTH OF INFANTS. (VARIATIONS, SOUS L'INFLUENCE DE LA RATION ALIMENTAIRE DU PERIMÈTRE (SUS-OMBILICAL) CHEZ LES NOURRISSONS ATTEINTS D'ECTASIE ABDOMINALE.) (*Société de Péd. de Paris.*)

In poorly nourished and developed children, who are below normal in height and weight, a lack of nourishment is indicated, not merely digestive disturbances. A large amount of food should be given in these cases because they need it for growth, which was demonstrated by fecal analyses, showing that they utilized it. Age and not weight should determine the amount.

With increased quantities of milk the abdominal girth decreased by 5 or 6 cm. in circumference. He did not think the condition was due to increased length of the intestine because of the rapid alteration in size and improvement, if not recovery, of the condition.

WM. A. MURPHY.

KELLEY, EUGENE R., M.D.: REPORT OF INFANTILE PARALYSIS IN THE STATE OF WASHINGTON DURING 1910. Assistant State Health Commissioner Walter Gellhorn, M.D., and John B. Manning, M.D. With an Appendix. Infantile Paralysis in the City of Seattle. By Willis H. Hall, M.D., First Assistant Medical Inspector, Seattle Health Department. Olympia, Wash., 1911.

There was practically an even distribution of cases between the larger cities and the smaller cities and the rural districts. The distribution between the two sides of the state where very different climatic conditions exist shows that the number of cases on the east and west sides was almost exactly proportionate to the population. This is interesting in view of the theory that excessive dryness and dust are two of the principal factors in the causation or transmission of the disease. The eastern part of the state is largely semi-arid with greater degree of dryness and strong winds carrying dust. It was noted however that there was a falling off in the number of cases at the beginning of the rainy season.

The clinical studies of the early symptoms correspond closely corroborated the observations made in other places.

J. F. SAMMIS.

MARSHALL, C. F.: THE PATERNAL TRANSMISSION OF SYPHILIS. (*British Journal of Children's Diseases,* May, 1912.)

Clinical Evidence.—(1) A woman may bear a syphilitic child by her first husband and afterward healthy children from a non-syphilitic husband. (2) After a series of syphilitic children, a healthy child may be born after mercurial treatment of father only.

Microbiological Evidence.—(1) Though the spirochete may be too large to enter the spermatozoon, it may be conveyed in fluid part of semen. (2) Levaditi and Hoffman have shown that spirochetæ do actually enter the ovum.

Serological.—While 71 per cent. of mothers of syphilitic children give a positive Wassermann, the point whether this infection is conceptional (from the fetus) or directly from the father to mother has been disputed with evidence that has been read both ways.

"It is improbable in the highest degree that a large number of married women should acquire syphilis in its primary form, pass through its secondary stages and never know it. Yet this is the supposition if we reject the belief that a syphilitic father may beget a syphilitic child quite independently of any previous infection of its mother." WM. A. MURPHY.

WACHENHEIM, F. L.: THE DIAGNOSTIC VALUE OF THE CUTANEOUS TUBERCULIN TEST OF V. PIRQUET. (*American Journal of Diseases of Children,* July, 1912, p. 29.)

The author reports results from 50 von Pirquet reactions. In 95 per cent. of all more or less run-down children a negative reaction was found, therefore a positive reaction is highly significant. Antituberculosis prophylaxis should be instituted in children giving a positive reaction. RICHARD M. SMITH.

FITZWILLIAMS, DUNCAN, C. L.: SYPHILITIC AFFECTIONS OF BONES MET WITH IN CHILDHOOD. (*British Journal of Children's Diseases,* March, 1912.)

The lesions are discussed under the headings: (1) Epiphysitis, so-called really perichondritis, occurs in the first six months and is to be differentiated from infantile scurvy and results of trauma. (2) Dactylitis, a rare affection, not developed before second or third year; the interphalangeal joints are involved; in that of tuberculous origin the middle of the phalanges, is more acute and followed by necrosis. (3) Periostitis, either local or general, usually at four to six years, follows slight injury, hence involvement of exposed points. Rickets, a diffuse periostitis, causes anterioposterior curve low down earlier in life than that of syphilitic origin. (4) Osteomyelitis may dissolve the continuity of bone without discharging through the skin.

He denies the necessarily luetic etiology of craniotabes and Parrot's nodes.

Treatment.—Has more success with liq. hyd. perchlor., in cod-liver oil and inunctions, which he prefers to salvarsan.

WM. A. MURPHY.

INFANTILE PARALYSIS IN MASSACHUSETTS IN 1910. (Reprinted from Monthly Bulletins of the Massachusetts State Board of Health for 1911. Boston, 1912.)

A large epidemic centre existed in Springfield with 148 cases in the city and a large number in the surrounding towns. The distribution appearing to be radial from Springfield. Another epidemic existed in Fall River with 89 cases in the city and more or less radial distribution in the contiguous towns. Rosenau, Sheppard and Amoss in attempts to transmit the disease to monkeys by inoculation with the nasal, pharyngeal and buccal secretions of 18 human cases were unsuccessful. Although the virus might have been so greatly diluted and so attenuated as to be incapable of causing infection in monkeys. The study of paralysis in the lower animals was not indicative of any positive relation between these cases and poliomyelitis as seen in humans.

J. F. SAMMIS.

POLLINI, A.: COAL DUST IN INFANT LUNGS. (*Riv. di Clin. Ped.,* June, 1912.)

The following results are given: (1) Infants under forty-five days rarely show coal dust. (2) Coal dust is found from forty-five days to eight months after birth in slight traces. (3) From eight months on the amount is sufficient to be measured. (4) Coal dust appears equally in the two lungs. (5) Coal dust usually is more plentiful in the upper lobes. (6) There appears to be no difference in presence of coal dust in infants reared in the cities and those in country surroundings.

C. D. MARTINETTI.

LUCAS, WILLIAM P.: "THE DIAGNOSIS OF INFANTILE PARALYSIS IN THE PRODROMAL AND EARLY ACUTE STAGE AS FOUND IN THE EXPERIMENTAL STUDY OF POLIOMYELITIS IN MONKEYS." (June, 1910.)

The author places special stress upon the change of disposition which may be (1) Restlessness coming on several days before any other symptom appears; (2) Irritability or (3) Apathy; (4) Pain particularly along the spine or in the joints of the extremities which often show marked swelling and tenderness. If with any of these symptoms some trouble in the upper air passages be present, such as coryza, sore throat or bronchitis, our suspicions should be aroused; some inflammation of the upper respiratory tract was present in all his monkeys and also in his 4 human cases.

The blood of his monkeys showed a leucopenia together with a lymphocytosis and an eosinophilia during the prodromal and early acute stages disappearing about the time the acute symptoms begin to subside.

The spinal fluid was increased in amount and the cell count greatly increased, the increase, in the incubation period, being largely mononuclear cells and in the early acute stage lymphocytes. A fibrin clot was present in the early stages but disappeared later. The cytological examination of the spinal fluid from his 4 human cases was practically identical with that found in monkeys. J. F. SAMMIS.

LANGSTEIN, LEO.: RACHITIS AND SPASMOPHILIA. (*Zeits. für Kinderhk.*, November 16, 1912, p. 260.)

Langstein reports the case of premature twins which were brought up on breast milk during the first period of observation, but, nevertheless, developed marked signs of rachitis. When the breast milk was stopped and artificial feeding substituted, at once spasmophilia developed (numerous convulsions). These convulsions stopped as soon as the infants were given breast milk again, only to reappear when artificial feeding was given. These interesting cases clearly show that rachitis can develop in breast feeding. They also show the close relationship between rachitis and tetany, which fact Kassowitz called attention to years ago. No less interesting is the curative and prophylactic effect of breast milk in the spasmophilic diathesis. JEROME S. LEOPOLD.

LEBREDO, MARIO G.: THE CUBAN EPIDEMIC OF POLIOMYELITIS IN 1909. Chief of the Section for the Study and Investigation of Transmissible Diseases and DR. ALBERTO RECIO. (Reprinted from *Sanidad y Beneficencia*, April, 1910.)

This was the first epidemic which has existed in the tropics and was doubtless carried from the United States. There was no change in its clinical manifestations which characterized it elsewhere. Its seasonal occurrence was the same as in the United States, the largest number of cases appearing in July and

August. Whites were more frequently attacked than negroes. All central foci were along the railroad line. The constant blood picture was a leucopenia with a relative large eosinophilia.

J. F. SAMMIS.

CONCETTI, L.: BRONCHOPNEUMONIA IN INFANCY. (*Riv. Osped.*, 1912, No. 8.)

This is eminently a practical and clinical study of the numerous cases treated in the Pediatric Clinic of Rome. Bronchopneumonia, frequently secondary to other maladies, presents itself in a multitude of forms, both in its clinical and anatomical aspect. In this it differs from lobar pneumonia, whose course is usually well defined. The author analyzes the symptoms based on the alterations found in the lung tissue, thus defining the principal modalities of the disease. The proper therapeutic measures are subsequently discussed. C. D. MARTINETTI.

INFANT FEEDING.

WEILL, E., AND MOURIQUOND, G: CLINICAL VALUE OF ALBUMEN MILK. (*Jour. de med. de Paris,* June, 1912.)

Use of eiweissmilch with 16 children, 10 sick and 6 well—formula of Finkelstein. Of the infants 9 died. Necropsy—2 due to bronchopneumonia, 1 to duodenal ulcer, 7 without evident cause. Both sick and well children lost weight and strength. Vomiting and other digestive troubles were increased, diarrhea appeared in the healthy children. Conclusions were that use of such a method of feeding is injurious to both sick and well.

WM. A. MURPHY.

PLANTENGA, B. P. B.: RAW MILK AS INFANT FOOD. (*Archiv. für Kinderhk.,* Vol. LVIII., p. 155.)

Comparative studies of the prolonged feeding of 6 infants with raw and boiled milk showed no differences in the digestive functions, weight and temperature curves or psychic state. The stools, however, were more watery in the periods of raw milk feeding. In a period of two years about 200 infants were fed with a milk which had been pasteurized for one-half hour at 70°C., and the next day heated in a Soxhlet apparatus for five minutes. Fed in this manner for five to eight months, 23 infants developed scorbutus. This seemed to bear out Neumann's contention that heating of milk at intervals was more potent in producing scorbutus than boiling it only once. However, to make this certain, the authors undertook a second feeding series. This time, however, though heated twice at the same temperature and for the same duration, the milk was fed twenty-four hours earlier than before. In this series of about 200 infants no case of scorbutus developed. In the last three years 5 cases of scorbutus were seen in those that were fed for a long time exclusively on a buttermilk mixture, which necessarily is not a fresh food. The diet in these was at first changed to a mixture of skim milk, flour, sugar and lactic acid, having the same composition as the buttermilk mixture. This was prepared the day before and boiled for fifteen minutes. The scorbutic symptoms under this diet became aggravated, necessitating its discontinuance. When, however, this mixture was given on the day of its preparation (having been boiled for fifteen minutes), the symptoms disappeared rapidly and permanently. The value of raw milk lies in the fact that it cannot be kept long and must be consumed within the first twenty-four hours. When fresh milk is boiled and used early the development of scorbutus need not be feared. S. FELDSTEIN.

LUST, F.: ON MILK SUGAR IN BREAST MILK. (*Monats. für Kinderhk.,* Bd. XI., Nr. 6, p. 236.)

A series of investigations were carried on in studying the milk sugar content of the milk of 25 women. The maximum amount found was 8.5 per cent.; the minimum, 5.7 per cent.; the average, 7.1 per cent. In 7 cases the children nursing from the women under investigation had a tendency to diarrhea. In comparing the number of stools in the infants with the sugar content of the mother's milk, it was found that the higher the sugar content of the milk the more numerous the infants' stools. In these cases the sugar content varied from 6.4 per cent. to 8.5 per cent. In 10 cases of constipation the sugar content of the milk varied from 5.7 per cent. to 7.2 per cent. The author believes that the cause of the difference is the varying acid formation in the intestines as a result of the varying amount of sugar ingested. Efforts to influence the amount of sugar in the women's milk by feeding large amounts of sugars, especially maltose, were not successful, except in exceptional cases. T. WOOD CLARKE.

BOOK REVIEWS.

"Handbuch der Nervenkrankheiten im Kindesalter." By Bruns, Cramer and Zieber. Pp. 980.

Pediatrists who have had occasion to refer to large text-books on neurology will find this book a great help; there is no other book, either in German or in English, which treats so fully of all the nervous diseases which usually occur, and which may occur, in childhood, as does this volume. This volume forms an invaluable addition to the Pfaundler and Schlossman system, for those who have had occasion to refer to this system about some nervous condition of childhood were often disappointed at the inadequacy of the information there obtained.

References to American literature, though more numerous than are usually found in German text-books, are still too few. The work of Flexner and Lewis on anterior poliomyelitis receives but a casual remark. There is nothing said of the recent findings of Cushny on hypophyseal disturbances; there is no special chapter on myatonia congenita, although recently 2 cases with autopsies were reported in American literature. Mental deficiency is not discussed at all. Certainly in frequency it is far more common than any other chronic nervous disturbance found in infancy and childhood; the chapter on spasmophilia is neither complete nor up to date. On the whole, pathology receives too little attention. The errors on the whole seem to be those of omission and not of commission, and, in spite of the few shortcomings enumerated, there is much that is praiseworthy.

The first part of the book is written by Cramer. In this part are treated "nervosität," hysteria, epilepsy, chorea, stuttering and tics of childhood. The second part is devoted to the study of the diseases of the spinal cord and the peripheral nerves. The portion written by Zieber deals with the diseases of the brain and its membranes.

By far the most interesting chapters are those written by Cramer; the anatomic, physiologic and psychologic peculiarities of the infant brain are clearly stated. In infants the dura is adherent to the skull and the arachnoid tufts are lacking; the brain is not as vascular as the adult brain. The brain at birth is relatively large. It is one-quarter the size that it reaches at full development. In infancy the reflexes are slightly exaggerated. The psychologic development of infancy is treated in a most interesting way, and the most interesting chapter of the book is that on the "Nervosität der Kinder." The author divides these cases into two classes—those which arise from endogenous causes (*i.e.,* psycopathic constitution or neuropathic disposition), and those due to neuropathic environment (*i.e.,* exogenous causes). Chief among the factors which cause exogenous nervosität are faulty bringing up, too little sleep, too much attention from adults, vanity of parents, overburdened children, trauma and acute infectious diseases.

The children suffering from endogenous "nervosität" are usually of the lymphatic type, gracile, anemic, easily susceptible to infections, have large tonsils and adenoids, are unable to fix their attention, have nervous heart disturbances, as arrhythmia, and rapid pulse. These children present stigmata of degeneration, developmental anomalies, and abnormalities in skull formation; dentition is late and other stigmata are present, as tors palatinus, congenital luxation. Darwinian tubercle, etc. These children may show anachronisms and tendency to herniæ; they may have idiosyncrasies to various foods; tics and tendency to fainting spells may be present; they suffer from all sorts of phobias, are spasmophilic and also have nocturnal enuresis. These children may suffer from migraine-like headaches, and at puberty they may have hallucinations; they may have compulsory ideas ("zwangsvorgange"), they may be afraid to touch or wash anything. The intellectual development is usually not disturbed.

The especially commendable features of the second part of the book are the historical descriptions and the very complete differential diagnosis; thus the diagnosis of anterior poliomyelitis is gone into very fully; it is differentiated from meningitis by the much shorter duration of fever (three to seven days); coma is much deeper and more prolonged in meningitis; herpes is rare in anterior poliomyelitis; exanthemata and catarrhal conditions of severe nature occur only in meningitis; the sequelæ of meningitis, deafness and middle ear inflammation, are not common in anterior poliomyelitis; the spinal fluid in poliomyelitis contains lymphocytes and no specific bacterium, whereas, in meningitis, there is an increased number of leukocytes and the specific coccus is found. Anterior poliomyelitis may run the course of a transverse myelitis and may also resemble Landry's paralysis. Other diseases from which it is differentiated are hematomyelia, multiple neuritis, birth palsies, "pseudoparalysis doulourensis," Parrot's disease, myatonia congenita, Barlow's disease, spinal progressive muscular atrophy, gliosis of the cord, spina bifidia, congenital muscular defects, conpression, paralysis and hysteria.

The most interesting chapters in the third part are those on the central palsies and tumors of the brain.

MARK S. REUBEN.

SEX EDUCATION. By IRA S. WILE, M.S., M.D.

This little book by Dr. Wile, who has recently been appointed to a place on the New York Board of Education, was written to assist parents to banish the difficulties and to suggest a plan for developing a course of instruction in sexual topics. The home of today is largely responsible for the weakness of instruction with reference to the development of the physiology of sex. The average child secures garbled and vulgar ideas from unreliable sources.

The author does not believe that this knowledge should be withheld by parents until puberty, but that instruction should begin when the child first expresses a desire to know as evidenced by questions. The truth should be told in all definiteness; an evasive answer or half truth is dangerous, more dangerous than a frank statement in phrases a child would understand.

In treating the subject of development, or various periods of child life, a division is made into the age of mythology, age of chivalry and the age of civic awakening, with suitable methods of handling the subject during each. The final chapter is on terminology and is a satisfactory presentation of the anatomy in a way that a non-medical person can readily understand.

WM. A. MURPHY.

EPIDEMIC PAROTITIS (MUMPS).—Morelli (*Pathologica,* August 15, 1912) brings forward evidence that mumps is an infective disease of not exclusively local nature, but rather partaking of similarity to an attenuated and non-characteristic septicemia with a tendency to localization in the salivary and genital organs. He regards it as probably excited by a special tetragenous coccus that he has isolated, although he has not been able to reproduce the disease experimentally. He relies very largely on the result of serological investigation for his conclusions.—*Universal Medical Record.*

ARCHIVES OF PEDIATRICS

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EDITORIAL.

THE QUARANTINE REACTION.

We have the Wassermann reaction, the Widal reaction, the tuberculin, the luetin, the diazo, the von Pirquet, and why not a "quarantine reaction" to express the manner in which the human being reacts to the institution of quarantine; sometimes, indeed, more of an ordeal than the inoculations or scarifications which accompany the others mentioned?

To the mind of the writer, the quarantine reaction is diagnostic of the quality of one's citizenship. A "positive quarantine reaction" denotes good, a "negative" bad, or only poor citizenship, and a "doubtful reaction" a gray quality of citizenship of the "didn't mean to do wrong" variety.

Quarantine for contagious diseases has been instituted by health authorities to protect the susceptible unexposed members of the community from an individual suffering from one of these diseases, by means of the simplest possible method of preventing contact with that individual. The mechanism of inspection, placarding, instructing and disinfecting is a costly mechanism and really is not carried on for the sole purpose of distributing the city's money to the needy members of the department. It is for the welfare of the whole community and, as with all such things, the welfare of the community may mean a curtailment of the freedom of the individual to some extent.

It is in the willingness or the reluctance to have one's personal freedom curtailed for another person's, or a thousand, or a million other persons' gain, that this specific reaction lies. As physicians we are very familiar with the negative reaction among the laity, who regard the Health Department as their enemy rather than their friend, and who, although they are angry enough if one of their children contracts measles or scarlet fever from some neighbor's child who runs loose, try by hook or crook to avoid going into isolation with their own sick and warning away outsiders by means of placards. They are usually well-meaning people enough, who would not entice a child into their apartments and murder him, or even "put poison in his tea," yet the avoidance of the responsibility of quarantine is, in essence, the same.

We may lay the blame for this negative reaction to ignorance or carelessness or indifference, if we will, but how explain it among intelligent people who are not ignorant and who do not seem careless? There is a trait of human nature which seems to account for this result, namely the reluctance of an individual to acknowledge that he is a whit less than perfectly sound and healthy. The dread of a taint of tuberculosis or of cancer illustrates this, and we see manifest cases of phthisis complaining of a "slight bronchitis" or the carcinoma rapidly becoming inoperable made light of until too late. By extension, this feeling applies to the members of one's own family and lies at the basis of the horror of quarantine quite as much as the inconveniences.

The unwillingness to consider one's self "unclean," so to speak, and dangerous, was never better illustrated than in the controversy which raged over the communicability of puerperal fever when Oliver Wendell Holmes dared to suggest that it was the hand of the physician that was at fault. His opponents opened the vials of their wrath upon his head, asserting that such a position was an insult to the profession, whose tender thought would always be particularly tender to a parturient woman and would never bring to her death by infection. This, notwithstanding the demonstration by Semmelweiss, that cleanliness and chlorine water had prevented such terrible results. Their vaporings, however, cleared away before the remorseless truth of the Autocrat's observations, and we, today, keep our hands clean.

And it is unfortunately quite true that physicians are at times no better than they should be and give a "doubtful quarantine reaction." Within a month we have heard a man say that he had had a severe diphtheria and, meaning praise, that Dr. So and So had not reported it. We recollect the case of a physician who removed a scarlet fever placard from his door. We believe that "German measles," as reported, often shows Koplik spots in the mouth. It takes a strong belief in the wisdom of health board regulations to survive the occurrence of Klebs-Loeffler bacilli in the throat of a physician who has a busy practice and who dreads the annoying inaction and, perhaps, the large money loss. We are all human beings and none of us knows until tried whether his reaction will be "positive" or "doubtful"—we hope it never could be "negative."

Which brings the question of why do physicians ever give anything but a positive reaction. They are surely better on the average than are most in their regard for the public welfare, and feel their responsibility more, and the men whom quarantine in their own homes irks most are sometimes considered among the best in the profession.

Is it the dislike of appearing "unclean," or the money loss, or just the inconvenience, or do they down deep in their hearts not approve of the isolation of contagious diseases and should our regulations be revised?

For our part we believe that careful isolation is essential and that it behooves every good doctor to insist on its observance and to be always and everywhere a teacher of the morality and altruism which a "positive quarantine reaction" implies. It is his duty to the community and the burden of his responsibility as the possessor of superior knowledge.

That the actual regulations now in force may have to be modified and made more flexible is also our belief. Five weeks' quarantine in some cases of scarlet fever is absurdly long, now that we fear the desquamation little, and it is also absurdly short in other cases, since we know that a running ear may start new cases after sixteen weeks. So in measles, so in diphtheria, if the organisms be non-virulent.

But as they stand quarantine regulations are necessary and right, and we fail if we do not live up to them.

ORIGINAL COMMUNICATIONS.

THE TREATMENT OF MENINGITIS BY DRAINAGE OF THE CISTERNA MAGNA.*†

BY IRVING S. HAYNES, PH.B., M.D.,

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College; Visiting Surgeon to the Harlem and Red Cross Hospitals; Fellow
of the New York Academy of Medicine; Member of the New York
Surgical Society, of the Alumni of Bellevue Hospital, etc.

Introduction.—Meningitis is an inflammation of the meninges of the brain, chiefly the pia-arachnoid, due to various pyogenic organisms. Meningitis is not necessarily a fatal disease. That it has been so uniformly fatal in the past is a confession of our failure to understand and utilize the fundamental principles upon which its successful treatment must depend. Our first effort must be, then, to determine what are the basic facts of meningitis.

Physiology.—Before undertaking this study, we must briefly state what are the intracranial conditions in the normal.

The control of the circulation by which a pulsating arterial stream is converted into the steady venous flow is vested in the automatic vasomotor system, in the peculiar construction at the jugular bulb and in the mechanical action of the Pacchionian bodies or in the elastic fontanels before these bodies are developed.

The situation is still further complicated by the presence of the cerebrospinal fluid. This fluid is secreted by the choroid plexuses of the ventricles, chiefly the lateral, and it flows from this source within the brain through the various ventricles and their connecting channels until it escapes from the fourth ventricle, partially through the foramina of Key and Retzius, but more especially through the wide irregular space—the foramen of Magendie—into the great subarachnoid space, the cisterna magna. From here, after bathing the spinal cord, it streams upward over the convexity of the brain to leave by means of the Pacchionian bodies, or, if they are not yet developed, by passing directly into the longitudinal sinus. This passage of the fluid into the sinus is one of the best attested facts of physiology.

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* Read, by invitation, at a regular meeting of the Jefferson Hospital Clinical Society, Philadelphia, Pa., January 17, 1913.

† In the preparation of this article, I have drawn freely from the papers by Dr. Kopetzky ("Meningitis: Nature, Cause, Diagnosis and Principles of Surgical Relief") and myself ("The Surgical Treatment of Meningitis: Its Scope and Accomplishment") presented at a meeting of the American Laryngological, Rhinological and Otological Society, Philadelphia, Pa., May 14, 1912. (Published in the *Laryngoscope* for June, 1912.) Also from a paper by myself upon "The Surgical Treatment of Pyogenic Meningitis by Drainage of the Cisterna Magna," read, by invitation, at the Ninth International Otological Congress, Boston, Mass., August 14, 1912. (Published in the *Processional* for that Congress, July, 1912.) Further, from the experiences derived from the treatment of such infections since the publication of these papers. The reader is referred to these sources for a bibliography upon the subject of meningitis.

There are other points of exit for the fluid, but with so little function that they may be disregarded not only in the normal, but also in the abnormal conditions.

The reasons why the cerebrospinal fluid passes into the sinus are, first, the vis-a-tergo. The fluid is a *secretion,* not an exudate or a transudate, produced by the choroid plexuses. It is under a pressure at all times slightly greater than that which prevails in the cranial sinuses. This difference of tension acts, therefore, to drive the fluid into the sinuses. Second, the difference in specific gravity between the cerebrospinal fluid and the blood. The specific gravity of the fluid is 1,005-1,010; of the blood, 1,059. The flow is always from the fluid of lesser into that of the greater specific gravity, hence the flow determined by osmosis is of the fluid into the venous blood.

The normal amount of cerebrospinal fluid within the skull is variable, but is probably from 60 to 80 c.cm. Just sufficient to properly lubricate the opposed serous surfaces, facilitate slight movements and assist in maintaining an even intracranial pressure.

There are many other related physiologic facts which we cannot consider in this connection.

Meningitis.—When infection of the meninges supervenes there are violent changes, especially affecting the intracranial circulation of the blood and the cerebrospinal fluid. In addition to these changes, which are chiefly mechanical, there are many others of a bio-chemical nature; the outward effects of these two separate but intimately related causes produce the symptoms of meningitis.

The Clinical Symptoms of Meningitis.—These are, briefly, headache, irritability, restlessness, insomnia; then more pronounced symptoms, as delirium, purposeless movements and convulsions; the insomnia will pass into drowsiness, hebetude, stupor, unconsciousness and coma. The pupils of the eyes will vary; when the patient is conscious they are contracted; when unconscious, they are dilated. Nystagmus may be present. There is stiffness of the muscles of the neck, and, later, retraction of the head. If the head is forcibly flexed on the chest the eyes will open, the pupils dilate and the arms and thighs be involuntarily flexed on the trunk. The "tache cerebral," Kernig's sign, and, if the patient is over two years of age, probably a Babinski, will be elicited. At first the reflexes are exaggerated, later they become abolished. Emaciation progresses very rapidly. The temperature is very irregular. The respirations, at first rapid, vary in rate and depth and finally become of the Cheyne-Stokes type. The pulse is that of fever at first, that is rapid, but when pressure is present it becomes slowed. The blood pressure rises.

The relation of these symptoms is important; by them can we obtain some idea of the nature of the processes within the cranium. To analyze them rapidly:—

With the onset of bacterial infection there is an immense outpouring of cerebrospinal fluid—the so-called meningitis serosa. On account of changes in the fluid and in the meninges due to their reaction to bacterial infection there arises an obstruction to the normal egress of this excess of fluid. The immediate result is a great increase of fluid within the skull and a tremendous rise in intracranial pressure. The skull is inexpansile, the brain is incompressible, the only structures which can yield to this pressure are the blood vessels. They become compressed. Less blood, and, at times, no blood, flows through them. The brain is deprived of its oxygen. The parts which feel this deprivation most, and where such deprivation leads to the most serious results, are the "vital centers" in the medulla. These centers are the vasomotor, cardiac and respiratory. They do not tamely submit to this loss of blood, they fight for their lives.

Through the vasomotor center the blood pressure is forced up until it is a little higher than the compressing force in the fluid, the slow and powerful contractions of the heart drive this blood through the compressed vessels and the centers are momentarily supplied with "good blood." At this instant, the respiratory center, for a moment in abeyance, starts up the respirations, but in an irregular manner which is characteristic of cerebral compression. With the impress of new blood into the vital centers they temporarily cease their activities, with the result that the blood pressure falls below that of the cerebrospinal fluid, the state of anemia again supervenes and the processes are repeated, constituting the "life and death struggle" so graphically described by von Schulten. The result of this process, unless relief be afforded to the struggling vital centers, is defeat for them and death to the patient.

The record of blood pressure, which we can take by a number of fairly accurate instruments, gives us an indication of the pressure which exists in the cerebrospinal fluid. We know that above a certain limit the damage is so extensive that recovery becomes impossible. This record of blood pressure increase coming on early, rising with the rise of intracranial pressure, gives us a most valuable guide to the progress of the meningitis. However, when coma supervenes and the vasomotor center is paralyzed, the blood pressure falls and ceases to have diagnostic value.

In addition to the rise in blood pressure there are other effects of this increased intracranial tension, notably the changes seen in the fundus of the eye. With the onset of pressure, some of the cerebrospinal fluid is forced into the sheath of the optic nerve, the circulation within the vessels of the nerve is obstructed. This is shown by a congestion in the retinal veins, with a swelling at the papilla—the papillary edema. Later, when the circulation comes to a standstill and inflammation is present, there is the "choked disc" of optic nerve atrophy and neuritis.

This papillary edema is an early and valuable sign. It means that there is still a chance to save life if the conditions can be relieved by reducing the intracranial pressure at once.

The Toxic Symptoms of Meningitis.—Bacteria are living units, which eat and excrete. Their products of excretion are poisonous, and are called ptomains and toxins. For their sustenance they must eat. They select their food from the carbohydrates and proteins of the tissues in which they live. They assimilate the carbohydrates directly, but the proteins must be broken up into other substances, some of which they utilize for food; the rest and the greater part is thrown off as useless for their purpose. These "by-products" of bacterial activity are virulent poisons to the organism harboring the bacteria. The combined effect of such bacterial life, growth and multiplication is to use up certain elements from the tissues within which they are situated and to discard other, to them, useless products which are poisonous to their host.

The reaction to these poisons on the part of their host is manifested by such general symptoms as chills, fever, rapid pulse, increased respirations, prostration, emaciation, and, in meningitis, by nervousness, depression, photophobia, sleeplessness, hallucinations, delirium, convulsions and even coma.

I have recited the foregoing symptoms of meningitis, not because you are unfamiliar with them, but to give a foundation for our later work.

Diagnosis.—Of all the signs and symptoms just given, there is not a single one which, when taken alone, proves our diagnosis. However, we do not need to remain in the dark. A lumbar puncture will withdraw cerebrospinal fluid and its examination places the exact diagnosis in our hands.

It has been shown that bacteria feed on sugar by preference. This sugar (or dextrose) is a constant constituent of the normal cerebrospinal fluid to the extent of from .04 to .08 per cent. Upon the onset of acute septic processes in the meninges this sugar disappears. Koptezky was the first to correlate these facts and *demonstrate* that the *disappearance* of *sugar from* the *cerebrospinal fluid* was an *invariable result* of *bacterial infection,* that the *absence* of *sugar* could be *determined before* the *bacteria themselves could be found,* and, further, that in *conditions simulating meningitis,* but *not caused* by *bacterial infection,* and *which* did *not eventually result* in *meningitis,* the *sugar* did *not* disappear from the fluid. Herein we have a test, which, thus far, has not failed in a single instance of acute infection to demonstrate the true state of affairs in the meninges. I consider this one of the finest examples of inductive reasoning, with an actual practical demonstration and application in surgery. There are other confirmatory findings in the cerebrospinal fluid. I can only mention them in passing. There is an abnormal number of cells, an excess of globulin and the potassium salts are found in appreciable quantity. With the preceding factors present, *it is not necessary for a diagnosis that the bacteria themselves be found.* To wait until they can be demonstrated in the cerebrospinal fluid means a delay of several hours, usually twenty-four; this may be just delay enough to tip the scales in favor of death.

I wish to emphasize the fact that it makes no difference to the patient whether he dies from a tubercular, a diplococcic or a streptococcic meningitis. He is dead and past relief. But it would make a difference to him whether we institute our treatment at once upon knowing that an infection of the meninges was present, even if the particular germ causing that infection was unknown.

Mortality and Prognosis.—The mortality in meningitis is appalling. In all but one variety it is almost universally fatal. The exception is the diplococcic form. The mortality in this variety before the advent of serum therapy was 75 per cent. Since the use of the serum the mortality has been reduced to around 25 per cent., and under exceptional conditions to 10 per cent. In all other varieties of pyogenic meningitis the prognosis is practically hopeless. The dead-house findings in cases of septic meningitis are used by some as an argument against surgical intervention. Because, they say, no operative attempt can possibly promote cure where there is present such extensive disease of the meninges, cortical surface and ventricles of the brain. I grant this. But I urge that the future pathology of this disease must be the "living" pathology ascertained by operation at an early stage in the meningitis when cure is possible. With equal justice one might claim that pulmonary consumption, or any other germ disease, was incurable when viewing the terminal effects of the process at autopsy.

Useless Classifications.—All meningitides are alike in being septic processes.

The various classifications which are found in the text-books are not only unnecessary for a proper understanding of the disease, but are positively misleading in that the attention of the reader is taken up by a multiplicity of details regarding each separate variety until he loses sight of the great fact that all meningitides have similar symptoms, due to the same causes, with like intracranial effects that result in common disaster.

Principles of Surgical Treatment.—How may life be saved?

By relieving intracranial pressure at the earliest possible moment. By furnishing good blood to the vital centers. By providing for the free and continuous escape of the excess of cerebrospinal fluid, and thus breaking the vicious cycle, until Nature can overcome the infection, restore the balance between the formation and excretion of the fluid and remove the results of the inflammatory process.

The first fundamental principle is, therefore, *that surgical treatment must be applied early;* it must *be* the *one* of *choice* and *not* the *one* of *last resort.*

Further, I urge that the same method of treatment is demanded in the early case of diplococcic infection as in any of the other varieties, because we do not know at this early hour which germ is present and when we do know it may be too late to save our patient. The necessary conclusion is that surgical relief must be given in all cases of septic meningitis.

Therefore, I maintain, that if this first examination shows the loss of the copper-reducing agent from the cerebrospinal fluid, but the actual germ is not detected at this examination, the case must be operated upon at once. However, if at this first examination the diplococcus of Weichselbaum is detected, then the meningitic serum should be given, a delay of not more than twenty-four hours follow, and if there is no improvement then an operation should be done. Because a second injection of serum may not be entirely harmless, its probability of relieving the disease diminishes with the lapse of time and, most serious of all, such delay renders futile any surgical effort.

The *second fundamental principle* is that cure can only come by providing drainage for this excess of cerebrospinal fluid to the surface, *freely, continuously,* until cure results or death ends the process.

Reasons for Past Failure.—Why surgery has so signally failed in the past to secure similar good results in this septic process that it has obtained in all other septic diseases, is that *drainage* has *not* been *afforded early, freely* nor *continuously.*

Of ventricular puncture, we claim that it has no logical or clinical justification for therapeutic use in meningitis. It cannot drain pus. It may not relieve pressure It adds a positive danger of infection of ventricles, cortex and meninges.

Of the *various plans* of *attack upon* the *spine* alone or in combination with craniotomy, or for the injection of antiseptic solutions or drugs into the subdural space, it is evident that they have all failed in the last two essentials of surgical treatment in not providing free and continuous escape for the infected cerebrospinal fluid. Besides they are attended by many positive dangers that contraindicate their use.

Operations upon the cranium have failed, with few exceptions, to obtain results.

The *explanation* is found in the anatomy of the part, the facts revealed by pathology and the conditions found at operation.

The brain is in intimate contact with the interior of the skull accessible to surgical attack, with one exception. This exception will be discussed in a moment.

In the event of meningitis, with an excess of cerebrospinal fluid and an increase in intracranial pressure, the brain is forcibly crowded against the skull. This produces two grave difficulties, either fatal to the success of the ordinary operation, for, if an opening is made into the skull anywhere over the convexity of the cerebrum or cerebellum, as soon as the dura is divided the brain is so forcibly crowded into the opening as to firmly "cork it up" and usually the brain tissue is lacerated against the edges of the opening. This is the universal testimony of operators and our own experience attests its truth.

If the brain is forced back and some form of drainage inserted, usually with greater or less damage to the cortex, fluid flows slowly, feebly and for a brief period.

The patients' symptoms may be temporarily ameliorated by the removal of the excess of pressure, but they soon return as the drainage diminishes and finally ceases. The reason is plain and is shown at autopsy.

As stated, the brain is crowded against the skull. Any drain introduced between these two structures is pressed upon by the former and speedily walled off by plastic lymph. The drains are soon isolated and fail to functionate. The case progresses as if no interference had been practiced.

Drainage from the Cisterna Magna.—The single exception to this intracranial condition and inevitable result is found at the space between the two poles of the cerebellum and between them and the medulla. This space is the cerebello-medullary angle, or hiatus. It is a part, and a large one, of the great subarachnoid space known as the cisterna magna. It lies close beneath the occipital bone accessible to surgical attack.

Anatomy furnishes us with the further information that this space is in free communication with all the other subarachnoid spaces about the brain and cord and, also, through a funnel-shaped opening—the foramen of Magendie—with the ventricles of the brain.

Physiology teaches us that the cerebrospinal fluid is secreted by the choroid plexuses of the ventricles and flows from them into the great cistern before taking its final course over the convexity of the brain to enter the sinuses.

Pathology finds that in this region the infected fluid first gathers and here the effects of inflammatory activity are most marked.

Our *surgical experience* is positive and substantiates my contention that *here the skull may be opened,* in the *manner* to be described, *and in the presence of great intracranial pressure without a hernia cerebelli occurring, and, further, that drainage established here is free and continuous.* The fact that *cerebellar hernia does not occur* is due to an anatomic reason and is perfectly clear. Owing to the architecture of the brain a space is left at this point opposite the inner surface of the occipital bone free from cortical contact and there is no brain at this place to protrude.

The *escape* of the *cerebrospinal* fluid *is both free and continuous,* because the drainage wick leads from a *natural cavity,* or space, and there are no surfaces to crowd together about it as exists everywhere else over the brain surface. Further, the drain will not be isolated by investing adhesions, as in other operations, for it lies within a space through which fluid is continuously flowing by way of the drain to the surface. Ordinary peritoneal drainage and its speedy isolation by adhesions resembles the former class of cranial drainage, while suprapubic drainage of the urinary bladder by rubber tissue closely imitates the latter method of drainage from the cisterna magna here advocated.

All the *evidence points* to the *cisterna magna* as the *one logical place where removal* of *pyogenic cerebrospinal fluid should be* practiced.

Objects of the Operation.—To make my position clear, I will state the objects of the operation, which are:—

(1) To open the cisterna magna, relieve intracranial pressure and restore the normal supply of blood to the vital centers.

(2) To accomplish this without danger of cerebellar hernia or of "corking up the foramen magnum by downward displacement of the brain stem."

(3) To prevent shock and possible death of the patient from too sudden escape of the cerebrospinal fluid.

(4) To provide for free and continuous drainage of the infected cerebrospinal fluid and thus enable Nature to effect a cure of the disease.

(5) To afford inspection of the foramen of Magendie and, if it is closed, its reopening.

(6) To forestall possible complications, especially hydrocephalus. Should hydrocephalus be present its relief and cure may be possible by this operation.

(7) To accomplish these desirable ends by an operation of

the simplest technic, in the minimum of time and with the least shock.

*Steps of the Operation.**—The scalp must be entirely shaved and the usual preoperative measures taken to secure and maintain absolute asepsis. The patient is placed, face downward, upon the operating table and the proper position maintained by the head-rest or by a competent, strong assistant who holds the head upon properly placed sand-bags. A cardiac sphygmomanometer is adjusted to the patient's arm or thigh and an assistant detailed to watch this and the patient's pulse and respirations and announce any variations in them.

Ether is administered, preferably through nasal tubes, by the warm spray method, beneath a sterile sheet covering the patient.

The incision is made in the mid-line from the occipital protuberance to the spinous process of the axis, and is carried down at once to the occipital bone and the posterior arch of the atlas. Any bleeding vessels are clamped and tied. The periosteum, with the attachments of the paired muscles, is separated from the occipital bone so as to expose a space from one and a half to two inches vertically by about an inch transversely at the foramen magnum, and less above toward the occipital protuberance.

An emissary vein may be encountered in the mid-line. I have found it present twice in eight operations and once in twelve cadavers. It is inconstant, usually very small when present and gives no trouble. Bleeding from it may be arrested by plugging the opening or boring into it with a blunt instrument. The self-retaining retractor is now introduced and the field thoroughly exposed. A DeVilbiss trephine, three-eighths of an inch in diameter, is applied in the mid-line and about an inch above the margin of the foramen magnum and the button of bone removed. The dura is carefully loosened from the bone by the dural separators and a DeVilbiss bone cutter employed to make two grooves or incisions through the bone into the foramen magnum. The separators must be used frequently to keep the dura loosened from the bone in advance of the cutter. The wedge of bone thus cut free is irregularly triangular in shape, about half an inch wide at the foramen magnum and half this above; its size can be varied according to the indications present. The wedge is loosened from the dural attachments, especially strong at the margin of the foramen magnum, and removed. The dura will present, under pressure, bulging into the bone gap. If present the occipital sinus or sinuses will be seen. If the sinus is single, it should be tied at its upper part and just beyond its bifurcation into the marginal sinuses. Right-angled dural ligature needles, right and left, have been devised for this purpose. If the sinus is double the incision can be made between them. Now make a very tiny incision into the dura; if the arachnoid is not also incised at this time, carry the dural incision up and down for the full length of the bone opening and then make a very small cut into the bulging arachnoid. The cerebrospinal fluid will spurt several inches high; save some of it for laboratory examination and control its flow by the finger placed over the opening. If there is a fall in blood pressure, check the flow for a moment or two. When the excess of fluid has drained away divide the arachnoid as wide as the dura and inspect the field, which will show the posterior poles of the cerebellum, the notch between and, at a depth of half an inch, the posterior surface of the medulla.

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* These are fully explained by a series of illustrations accompanying my original paper published in the *Laryngoscope* for June, 1912.

If the cerebrospinal fluid is clear or even slightly turbid, the operation stops here. But should there be a thick, plastic exudate filling up the cerebello-medullary hiatus, it would be wise to carefully introduce the cerebellar pushers and gently lift upward the lobes of the cerebellum and at the same time separate them from each other. This would tear apart any adhesions which might have formed to block up the foramen of Magendie without disturbing the medulla. I have not had occasion to do this yet on the living subject.

The operation is completed by placing between the edges of the incised arachnoid and dura a wick of rubber (gutta-percha) tissue, folded in accordion pleats several times so as to be about one-fourth of an inch wide. This drain projects into the cisterna magna at least one-fourth of an inch. The soft parts are allowed to fall together and are united by from two to four deep catgut sutures and the skin by interrupted silkworm gut sutures. A thick dressing is applied. The patient is returned to bed, being turned and moved in a slow and careful manner because of the absence of the normal water buffer about the brain-stem.

The entire operation takes from fifteen to twenty minutes in children and from twenty to thirty minutes in full-grown adults.

What Are the Difficulties of the Operation?—Thus far there have been none. The cisterna magna was easily and quickly reached in all cases, demonstrating perfectly how simple and safe this operation is. Hemorrhage has been limited entirely to the parts outside of the skull and was so easily arrested as to become almost a negligible factor. There has been no hemorrhage in any of the cases from the bone or from the membranes beneath.

If the occipital sinus is present in the field the incision can be made alongside of it or it may require ligation. As to the danger of the escape of the cerebrospinal fluid, with ordinary care this can be controlled by drawing off the excess with an aspirating needle or by making a small initial incision in the membranes, and using the finger as a stop-cock to regulate the flow of the fluid. In the 8 cases which I have operated upon, in no instance have any symptoms arisen from the escape of the fluid.

Regarding the danger of external infection. Infection is already present. The operation is undertaken to relieve the individual of its effects and possibly cure the disease. No more valid objection against operating in these cases exists than in the presence of infection in any other part of the body, even less, for often unrelieved suppuration elsewhere may spontaneously open and drain itself; but from the cranial cavity, never!

What Are the Advantages of the Operation?—The cisterna magna is freely opened at its largest and most favorable place for the evacuation of any fluid it may contain. Drainage established here effectually taps all other affected regions within and without the brain and cord. Furthermore, once drainage is established, the fresh secretions of the cerebrospinal fluid are more potent in their bactericidal elements than before, and every hour gained in life leads to greater probabilities of a complete cure (moribund cases excepted).

That drainage is free and efficient has been proved in all my own cases, and this is the report I receive from those who have performed this operation. It has continued up to the time of death or recovery.

In the operations which have hitherto been performed for septic meningitis drainage has been obtained only under great difficulties, imperfectly or for brief periods.

Ballance and Kuemmell had to trephine on both sides of the skull to obtain drainage. Parkin, Ord and Waterhouse and Hall had to contend against great cerebellar pressure to introduce their drainage material. Furthermore, all of these operations have been attended with protrusion of the cerebellum into the trephine opening. "Hernia of the cerebellum" interfered with Ballance and later with Kuemmell. Parkin had to push the cerebellum out of the way before he could go on with the operation, and Hall, who operated upon a patient after the plan of Parkin, states that "the cerebellum protruded so forcibly into the trephine opening that its substance was lacerated against the edges of the bone." Ord and Waterhouse found that the "cerebellum bulged into the trephine opening, fitting it tightly like a cork in a bottle."

I have opened the skull by the method which I have just described when the cerebrospinal fluid spurted to a height of from three to fourteen inches without the poles of the cerebellum even appearing within the opening.

Secondary Measures.—As to the use of secondary remedial measures, they may be summed up in advising the free use of hexamethelenamin and all sustaining drugs and means with such sedatives as may be necessary.

In Conclusion, I wish to claim that relief of intracranial pressure is possible by this operation, and that such relief is without danger of cerebral hernia. Drainage is free and continuous.

Unfortunately, all of my own cases have died. This is no discredit to the operation nor does this result invalidate my contentions. These results simply mean that operative relief must be offered at the beginning of the disease. Delay brings disaster.

If a patient presents head symptoms, a rising blood pressure, venous engorgement and edema of the optic papilla, with the absence of the copper-reducing elements from the cerebrospinal fluid, the diagnosis is absolutely sure. The disease is septic meningitis. The end is certain, unless relief be afforded by instant, free and continuous escape from the skull of the excess of cerebrospinal fluid with its content of deadly bacteria and poisons.

THE LUETIN REACTION IN DERMATOLOGY.—Daisy Robinson (*Journal of Cutaneous Diseases,* July, 1912) gives the results of a careful investigation into the diagnostic value of Noguchi's luetin reaction in dermatologic cases. The author concludes that the reaction is certainly specific for syphilis, but is absent in primary and secondary untreated cases. It is present in all tertiary, latent, and late hereditary cases; it may be positive in secondary treated cases. Finally, it may be said that the luetin reaction is more constant than the Wassermann in tertiary, latent, and late hereditary syphilis.—*Universal Medical Record.*

ONE HUNDRED INFANTS FOLLOWED FROM BIRTH TO THE END OF THE FIRST YEAR.*

BY CHARLES HERRMAN, M.D.,

Attending Pediatrist to the Lebanon Hospital and to the Beth David Hospital; Instructor in Pediatrics, Columbia University; Chief of the Department for Diseases of Children, Vanderbilt Clinic, New York.

This work was originally undertaken for the purpose of ascertaining what could be done in lowering the death rate in a series of infants by advising the mothers and supervising the infants from their birth. The cause of death being determined, the best method of preventing death could be ascertained. However, as the work progressed it became apparent that other valuable data could be obtained. Although everyone recognizes the important rôle played by predisposition in the causation of disease, it sometimes seems as if outside agencies were given too much and the peculiarities of the individual too little consideration. The wonderful discoveries in bacteriology are partly responsible for this. Several of the infants of this series were referred to the hospital by practicing physicians with the diagnosis of pneumonia. It is true they had rapid breathing and some rise of temperature, but a careful examination, together with a knowledge of the previous history, showed that they were suffering from one of a series of attacks of recurring diffuse bronchitis which represented one of the manifestations of the exudative diathesis in that particular infant. Several other infants in the series had recurring attacks of loose, mucous stools. In a bottle-fed baby one might think of some bacterial contamination of the milk as the cause; in a breast-fed baby possibly some disturbance in the mother or carelessness in carrying out the rules of feeding. Again, in looking over the entire history of the case, it became apparent that these recurring attacks were no more acute intestinal indigestion than were the attacks of cyclic vomiting acute gastritis. It seems much more likely that such attacks represent, so to speak, the explosion which results from the accumulation of some injurious material due to some profound disturbance of metabolism. They remind one of uremic attacks. The patient is apparently well; then the toxic material accumulates to a certain point and there is an explosion, as if the body were trying to rid itself of the injurious substances. I believe that a careful study of a series of infants followed from birth through infancy and childhood will give us many a clue that will help in solving these problems of etiology. Having in our hands a means of detecting certain tendencies early, we may find a method of preventing their further development.

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* Read at the Annual Meeting of the American Pediatric Society, Lake Mohonk, June 1, 1911.

Briefly stated, the method of procedure was as follows: From June 1, 1909, to June 1, 1910, 172 babies were born in the maternity ward of the Lebanon Hospital. About one-half of the mothers applied at the hospital or the dispensary a short time before delivery. At that time they were examined and given instruction especially with regard to the care of the breasts. After delivery in the hospital they were instructed in the care and feeding of infants and were given the following printed form:—

LEBANON HOSPITAL,

Westchester and Cauldwell Avenues.

DEPARTMENT FOR DISEASES OF CHILDREN.

Put the baby to the breast every three (3) hours during the day, and only once (1) at night.

Give nothing but the breast milk.

Do not stop breast feeding unless advised to do so by the doctor.

If you think that the breast milk does not agree with the baby, or that you have not enough, ask the doctor how to prepare the cow's milk.

Have the baby examined and weighed once a month in order to be sure that it is getting along all right.

The advice is given in order to prevent the baby from getting sick.

If the baby vomits, or has bad bowels, see the doctor at once.

They were also given a card to the pediatric department of the dispensary with the request that they report within ten days after leaving the hospital or, in special cases, sooner. If they did not come at that time, or if they failed to appear at the regular monthly visit thereafter, a postal-card was sent, and if they still failed to respond a visit to the home was made. I do not consider this the best method, but not having had a regular visiting nurse at that time we were compelled to adopt it.

SPECIMEN CARD.

LEBANON HOSPITAL,
WESTCHESTER AND CAULDWELL AVENUES.
DEPARTMENT FOR DISEASES OF CHILDREN.

NEW YORK..191

DEAR MRS...

PLEASE BRING..

TO THE LEBANON HOSPITAL DISPENSARY ON TUESDAY, THURSDAY OR SATURDAY, AT 2 O'CLOCK, TO BE EXAMINED, WEIGHED AND ADVISED.

DR. CHARLES HERRMAN.

Sick babies were to be brought to the dispensary immediately; very sick babies were referred to the babies' ward of the hospital. The history card of those patients who required special attention and supervision was marked with a red cross in the upper left-hand corner. These included premature and sick infants, those having careless or ignorant mothers, and those in whose family several infants had died. No milk was distributed. In only a very few instances was the mother unable to obtain bottled milk and to modify it properly. Only simple modifications were used.

The following Table I gives a summary of the infants studied, the nationality of the parents, the number of children and the percentage of the infants breast-fed. The following cases illustrate points of special interest:—

TABLE I.

Total number of births..	172
Number of deaths.......	14
Followed 1 year..........	125
Males	100
Females	72

NATIONALITY OF PARENTS.

Russian	52	per cent.
U. S....	19	"
Austrian.. ...	10	"
German.....	6	"
English......	5	"
Italian	2	"
Finnish......	1	"
Swedish......	1	"
French.......	1	"
N. A. Indian..	1	"
Danish.......	1	"

INFANT WAS THE

1st	child in	33	per cent.
2d	"	28	"
3d	"	12	"
4th	"	11	"
5th	"	4	"
6th	"	3	"
7th	"	3	"
8th	"	2	"
9th	"	2	"
14th	"	1	"

PER CENT. BREAST FED.

Months.	Exclusively.	Partly.
– 1	6	4
1	9	3
2	9	3
3	3	2
4	5	3
5	1	2
6	5	4
7	5	3
8	5	3
9	3	8
10	6	7
11	5	5
12+	37	52

CHART I. Reappearance of breast milk after the breast had not functionated for ten weeks. When the baby was three weeks old the mother was compelled to go to a hospital to have a gynecologic operation performed, so that it became necessary to put the baby on cow's milk. From that time the baby had more or less digestive disturbance and gained very little in weight, until at thirteen weeks of age, that is, after an interval of ten weeks, the mother was able to return home and the baby was again put to the breast. At first mixed feeding was necessary, but after two weeks the mother was able to give the breast exclusively and continued to do so until the forty-fifth week. This case was observed by Dr. Sidney Haas, to whom I am indebted for the notes.

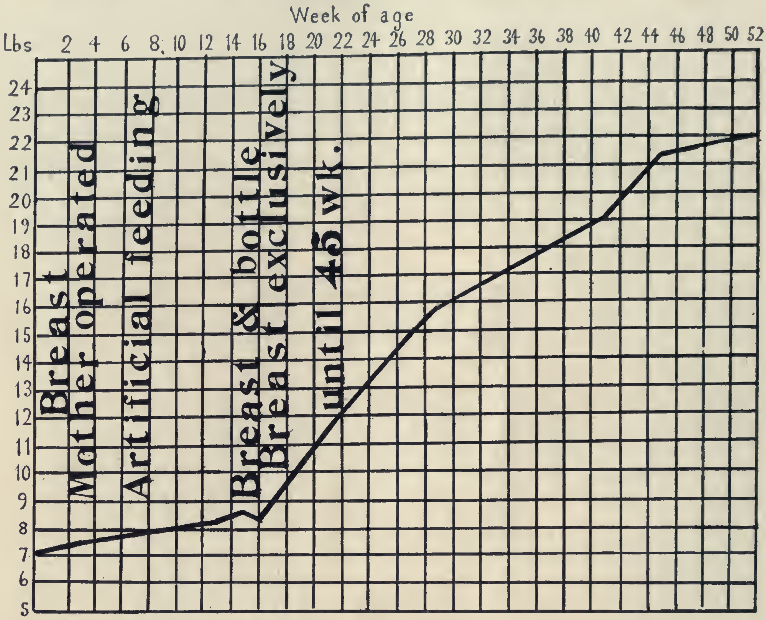


CHART 1.

CHART 2. A marked increase in the weight of the infant, although the mother thought that she did not have enough breast milk. I have selected this case as the most striking, but it was not an unusual occurrence. It was necessary to weigh the baby repeatedly before and after nursing and to compare the increase in weight with that of the average baby in order to convince the mother that she had more than enough. The weight curve shows that at seven months the baby weighed nearly 25 pounds. At the end of the first year it weighed 30 pounds.

CHART 3. Showing the importance of proper advice in order to counteract the improper advice of neighbors and friends.

After the mother's return home from the hospital she was advised by a neighbor to put the baby on the bottle so that she could go out to work. She did so, and, as a result, the baby lost weight rapidly. On her visit to the dispensary the mother was advised to stay at home and nurse the baby. During the next four weeks it gained 3 pounds and it was kept at the breast for eleven months.

CHART 4. Showing a defective gain in weight during the first three months at the breast followed by a rather sudden and continued rise, notwithstanding the fact that no change in the method of feeding was made.

This baby was the fifth child and was born prematurely; weight, 3¾ pounds. The mother informed me that all her children were small at birth and that, although she always had plenty of breast milk, they did not thrive until about three months of

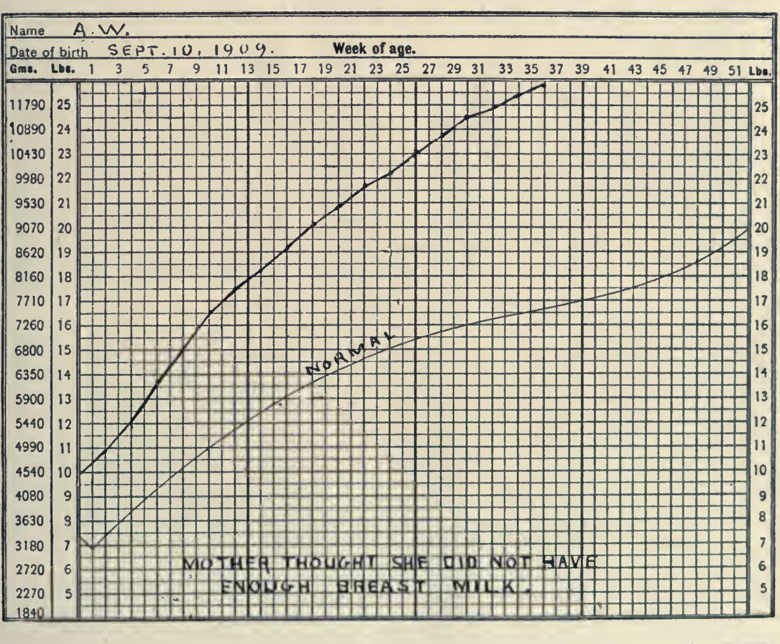


CHART 2.

age. In this case also, although the mother had a sufficient quantity of breast milk, and although there was no digestive disturbance, the baby gained only 2½ pounds during the first three months. At that time, without any change in the method of feeding, the baby began to increase rapidly in weight, so that during the second three months it gained 5¾ pounds. The most plausible explanation of such a phenomenon would seem to be that until the third month certain structures have not reached a point in their development where they are able to perform their function normally. We know that this is true of certain glandular organs. I have noted this phenomenon in a number of artificially- as well as breast-fed infants.

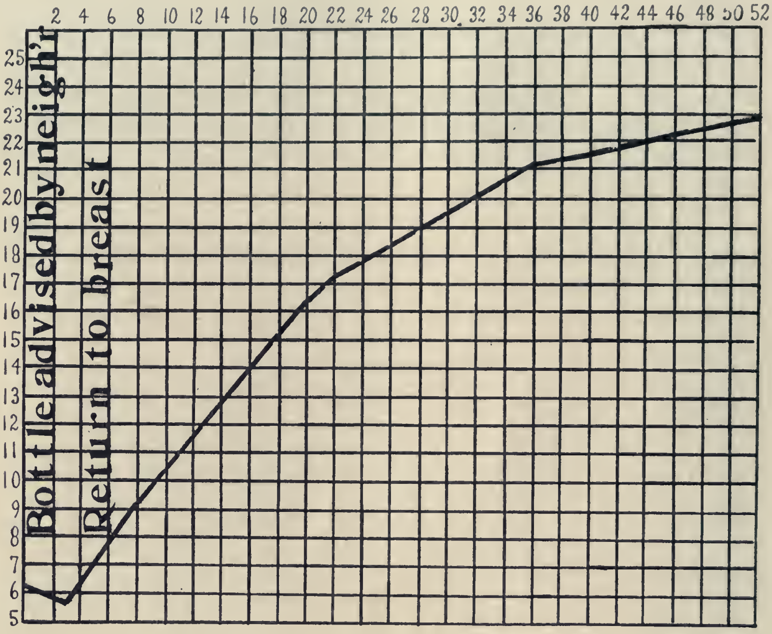


CHART 3.

Chart 5 and 6. Showing two typical examples of the "Exudative Diathesis."

In the entire series 20 per cent. showed some manifestation of this diathesis.

Chart 5. At two weeks of age this baby had thrush. At four months mixed feeding was necessary and was followed by an attack of bronchitis. At five and a half months the baby was weaned and shortly after a facial eczema appeared. At eight months it presented a geographical tongue and had an attack of urticaria. At nine and a half and again at ten months it was vaccinated without success. At this time the baby had another attack of bronchitis and urticaria. At eleven and a half months it had an attack of loose mucous stools, and at thirteen months a similar attack. During the first year every attempt to give beef-juice or egg was followed by urticaria. At eighteen months these could be given without producing any disagreeable effect.

CHART 6. This baby presented a geographical tongue at four months of age and shortly afterward intertrigo, bronchitis and an attack of loose mucous stools. It was vaccinated without success at six and a half months. The attacks of mucous stools and bronchitis were repeated at eight and a half and ten months respectfully. At ten and a half months the baby was referred to the hospital by a private physician with the diagnosis of a probable pneumonia. A careful examination of the case, together with a consideration of the previous history, showed that the child was suffering from one of a series of attacks of recurring diffuse bronchitis. At sixteen months the patient had another similar attack. These attacks had an asthmatic character, so that the rapid breathing, together with some rise of temperature,

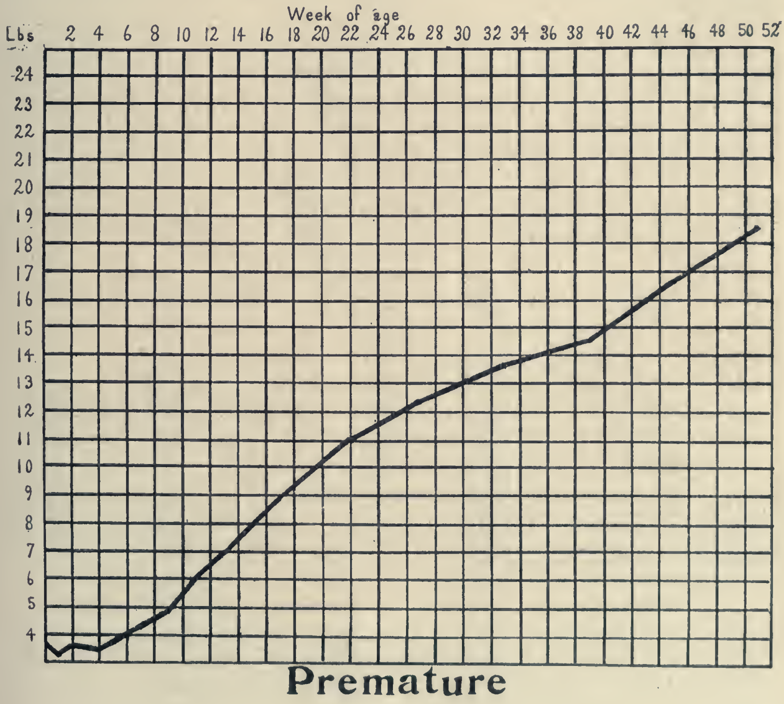


CHART 4.

naturally led to the diagnosis of pneumonia. I have no doubt that many of the cases diagnosed as having had a "touch" of pneumonia are of this type. No definite physical signs of consolidation are found and the patients recover in a few days.

I should like to emphasize the fact that thrush, recurring attacks of diffuse bronchitis, and recurring attacks of mucous stools are not uncommon in children with the exudate diathesis.

Whether the acidity or lessened alkalinity of the oral secretion which favors the growth of the parasite is regularly present in these cases I am unable to say, but it is, I believe, significant. The recurring attacks of bronchitis are distinctly influenced by the character of the food. We are accustomed to put these infants on a milk-free diet during the acute stage of the attack and note a fall of temperature and improvement in the signs on the chest as well as the breathing. Since the attacks of mucous stools are not due primarily to indiscretions in diet or bacterial contamination of the milk, it is not necessary to give an absolutely milk-free diet. We have usually given skimmed milk diluted with barley water, according to the age of the child and without the addition of sugar.

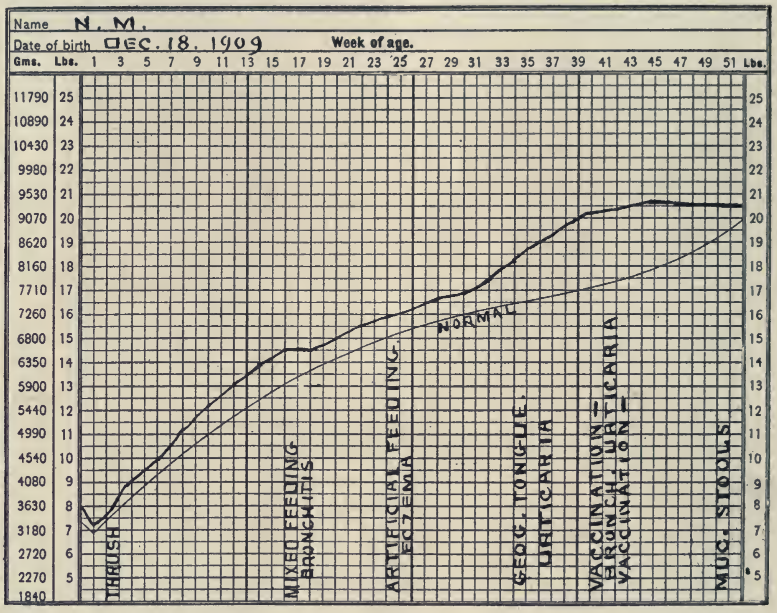


CHART 5.

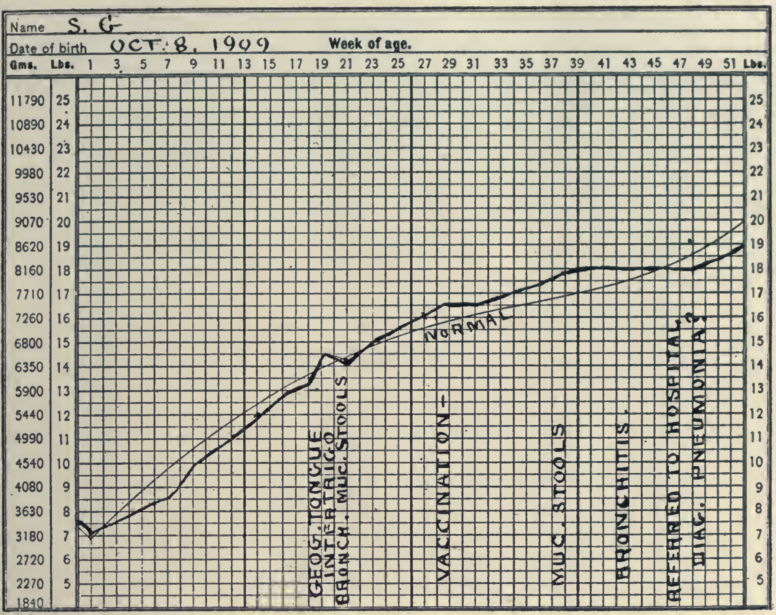


CHART 6.

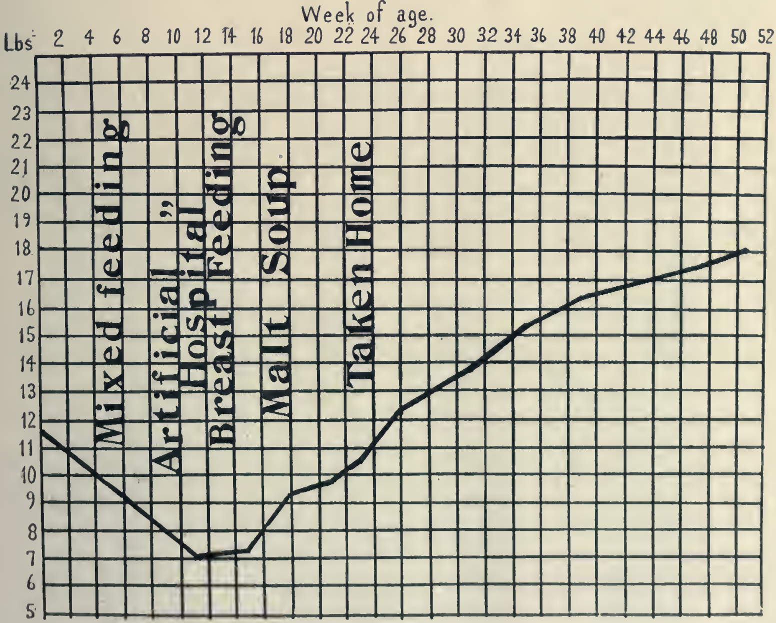


CHART 7.

CHART 7. Showing the importance of a babies' ward to which very sick infants may be referred and the necessity of having breast milk for desperate cases. This patient was the fourteenth child born to the mother. Of the thirteen preceding, twelve had died, almost all of digestive disturbances before the end of the first year. The only child that survived had received the breast for three months, the rest only for one week. At birth the patient weighed 11½ pounds. The mother had very little breast milk, so that for six weeks it was on mixed feeding and the next four weeks on artificial feeding. At eleven weeks of age the baby weighed only 7 pounds (Fig. 1, A.), having lost 4½ pounds since birth and its condition was so desperate that it was referred to the babies' ward of the hospital. On admission, the patient had a subnormal temperature, petechial spots and beginning sclerema, so that it was not expected that it would live forty-eight hours. However, it was given small quantities of breast milk obtained from one of the patients in the maternity ward, and, much to our surprise, it improved somewhat from day to day. It was kept on breast milk exclusively for three weeks and then on breast milk and Keller's malt soup. The baby

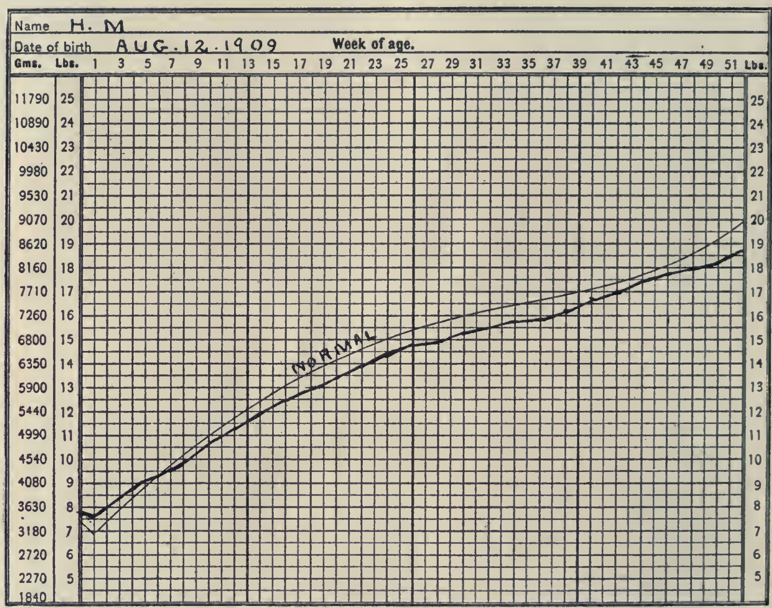


CHART 8.

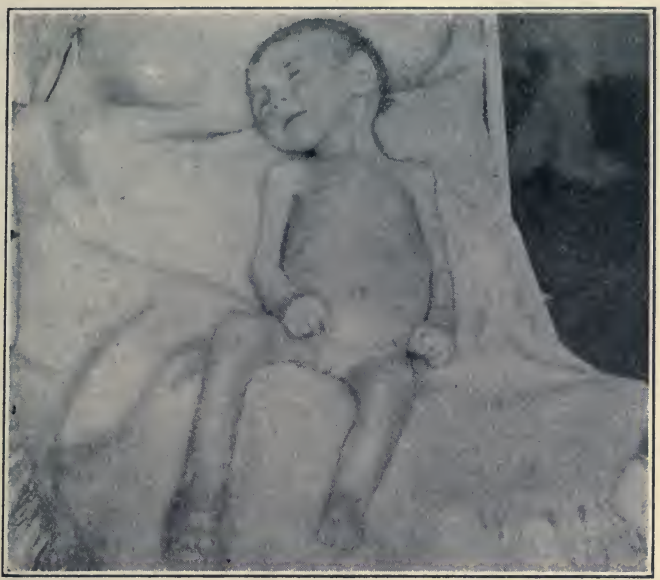


FIG. 1 A.—I. S. Age 2½ months. 7 pounds.

remained for ten weeks, during which time it gained 2 pounds and 10 ounces. The baby continued to thrive at home, so that at the end of the first year it weighed 18 pounds. (Fig. 1, B.)

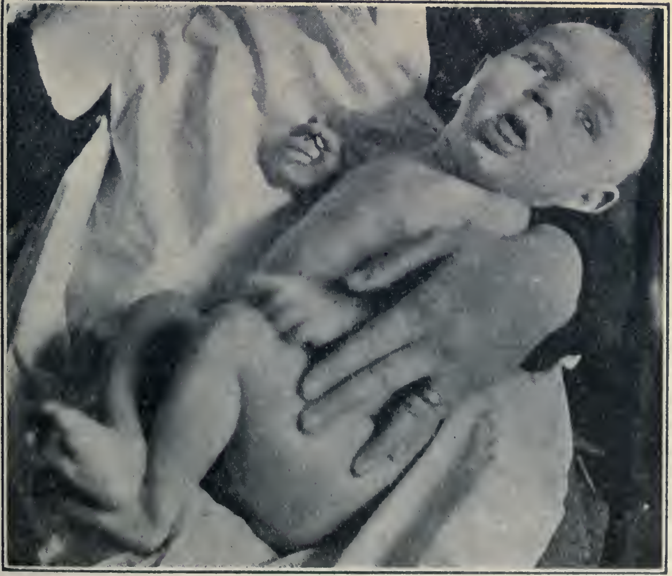


FIG. 1 B.—I. S. Age 9 months. 16 pounds 5 ounces.

CHART 8. Showing that breast feeding may be possible in an infant, although several preceding infants were not nursed. This child was the ninth born to the mother. The first five were nursed for one year; the sixth was nursed for two months, and for the seventh and eighth the mother had no breast milk, while the ninth, the present case, was successfully nursed for over one year.

The following, Table 2, gives a summary of the deaths. In addition to the 14 who died, 125 were followed to the end of the first year, making a total of 139, and a mortality during the first year of 10 per cent. Of the 14 deaths, 9 occurred in males, 5 in females; 11 were first-born, that is, 80 per cent.; whereas, among the total number (Table 1) only 33 per cent. were first-born. The reason was this high mortality among the first-born is due partly to the large number of premature births, the difficult labor and probably the inexperience of the mother in matters of infant feeding and hygiene. Six of the deaths occurred in premature infants, one of which was also syphilitic. This

TABLE 2.

SUMMARY OF DEATHS.

	Sex	Number of Child	Breast First	Labor	Weight	Age Exit	Breast	Why Weaned	
1	F	1		Premature	3–4	3 days			
2	M	1		Premature	3–8	7 days	7 days		Mother eclampsia
3	M	1		Premature	4–	2 weeks	2 weeks		
4	F	1		Premature	4–12	2½ mos.	4 weeks	Work	Illegitimate malnutrition
5	F	1		Premature	5–4	10 days	10 days		Syphilis
6	M	2	5 days	Premature	5–2	4 weeks	3 weeks		
7	M	1		Instrument	5–8	2 weeks	2 weeks		Erb's paralysis
8	M	1		Cæsarean	6–9	6 weeks	2 weeks	Asylum	Illegitimate malnutrition
9	M	1			7–8	2 weeks	2 weeks		
10	F	1			7–9	3½ mos.	2 weeks	Work	Illegitimate malnutrition
11	M	1		Twin	5–9	9 mos.	5 mos.		Measles, pneumonia
12	M	1			6–4	3½ mos.	2 mos.		Malnutrition
13	F	2	2 weeks		7–	6 mos.	2 weeks		Malnutrition
14	M	2	1 year		8–6	6 mos.	3 mos.		

portion of the infant mortality can only be reduced by methods which are employed before the child is born. Hospital care may save a few, but no marked diminution can be obtained by means which begin with the birth of the child, much less with such agencies as milk or infant welfare stations which began still later. One labor was instrumental, one a Cæsarean section, and one a twin. Seven of the fourteen infants weighed 5½ pounds or less at birth; seven lived four weeks or less, and of these seven three lived less than two weeks and three just two weeks. The three infants that lived to be six weeks or more had all been weaned some time previous to their death, so that not a single child over two weeks died while receiving the breast. Two mothers were compelled to wean their babies because they had to go to work, one because the baby was placed in an asylum. Three of the infants were illegitimate.

The following Table 3 gives a summary of the physical and mental development of the entire series. It will be noted that, on the whole, this was unusually good. Seventy per cent. had their first teeth at or before eight and a half months; 84 per cent. could sit up alone at eight and a half months; 84 per cent. could stand alone at fourteen months; 87 per cent. could walk at fif-

TABLE 3.

PHYSICAL AND MENTAL DEVELOPMENT EXPRESSED IN PERCENTAGES AT DIFFERENT AGES.

	Total Noted	MONTHS OF AGE																																
		1½	2	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	10½	11	11½	12	12½	13	13½	14	15	16	17	18	19	20	21
Smile...	76	50	30	8	8	4	..	...	..	...	..	...	..	...	..	...	.	...	..	....	..	....	..	....	..	....	..	..	..	..	..	..	..	..
Hold up head	102	...	..	2	59	13	13	7	5	...	1	...	..	...	..	...	.	...	..	....	..	....	..	....	..	....	..	..	..	..	..	..	..	..
Grasp objects	85	...	..	...	..	7	19	22	32	11	6	3	..	...	..	...	.	...	..	....	..	....	..	....	..	....	..	..	..	..	..	..	..	..
First teeth	121	...	..	...	..	...	..	2	2	3	4	6	16	9	16	12	6	5	6	2	4	3	4	1	..	....	..	..	..	..	..	..	..	..
Sit......	126	...	..	...	..	...	..	...	2	3	13	13	18	10	15	10	7	6	1	1	..	1	..	....	..	....	..	..	..	..	..	..	..	..
Stand...	97	...	..	...	..	...	..	...	..	...	..	...	..	...	..	...	.	2	4	2	12	7	19	8	14	8	8	10	1	3	1	1	..	..
Walk...	69	...	..	...	..	...	..	...	..	...	..	...	..	...	..	...	.	...	1	1	4	5	12	15	15	6	13	15	7	3	3	..	..	..
Single words	86	...	..	...	..	...	..	...	..	...	..	...	..	...	..	...	.	...	..	....	..	....	18	....	42	....	15	15	4	2	4	..	..	..
Fontanel close	56	...	..	...	..	...	..	...	..	...	..	...	..	...	..	...	.	...	..	....	..	....	..	....	2	....	13	16	16	6	18	6	16	7

teen months; in 93 per cent. the anterior fontanel was closed at twenty months; 90 per cent. could say single words at fifteen months. The comparatively good physical development was largely due to the fact that over 80 per cent. of these infants received breast milk exclusively or partly for at least five months.

250 West 88th Street.

CULTIVATION OF THE VIRUS OF POLIOMYELITIS.—S. Flexner and H. Noguchi report that they have succeeded in cultivating on artificial media the virus of infantile paralysis. They employed for their experiments tissues from the brain and spinal cord of human beings who died of epidemic poliomyelitis, and of monkeys the subjects of the experimental disease. The cultivations were conducted both with Berkefeld filtrates and tissues in substance. The culture mediums consist, first, of sterile, unfiltered ascitic fluid or of brain extract to which fragments of sterile rabbit kidney and a layer of paraffin oil have been added, and of these plus 2 per cent. nutrient agar-agar in proportions of 1 to 2. The cultivations are conducted under anaerobic conditions, and the colonies do not ascend to the summit of the deep layer of solid medium. The minute colonies are composed of globular or globoid bodies, averaging in young cultures 0.15 to 0.3 micron in size. The bodies appear in a variety of arrangements—single, double, short chains and masses. Often they appear embedded in a material of different refractive index. In older cultures certain bizarre forms have been noted. The cultivated bodies stain a pale reddish violet in Giemsa's solution, and bodies of identical appearance have been demonstrated by Noguchi, also with Giemsa's solution, by a specially devised method in films prepared directly from the nervous tissues. Monkeys have been inoculated with the cultures. Two series of inoculations have been made and a third series is in progress. Cultures from human tissues in the third, and from monkey tissues in the fifth generation have caused typical experimental poliomyelitis in the monkey. The findings at autopsy and the microscopic appearances of sections of the spinal cord, medulla, and intervertebral ganglia were characteristic of the disease. From the nervous tissues of these animals other monkeys were successfully inoculated and pure cultures recovered.

ORTHODONTIA.

BY FREDERICK R. STATHERS, D.D.S.,
Philadelphia.

Orthodontia, or dental orthopedics, is a branch of dental science treating of irregularities of the teeth. As we understand it, however, there is much more in this branch of dental science than this definition implies. It is impossible in one short paper to cover the subject thoroughly, so I shall attempt only to call your attention to the relation or interdependence existing between the teeth, the bones supporting them, and the adjacent parts.

Life is the result of a balance which exists between the organism and its environment. As the mission of the science of medicine is to restore and maintain this balance, so do we look upon this branch of dental science; for in all cases presenting for orthodontic treatment abnormal function of the part is present. Harmony and balance of the features are to be greatly desired, but the normal function of the part is certainly of much greater importance.

By the study of comparative anatomy we find that a definite relation exists between the teeth, their size, shape and position in the arch with the rest of the bones of the head in members of the same species; that the shape, size and position were those best adapted to the habits and environment of the species.

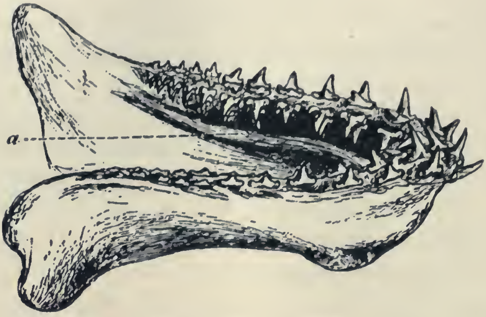
We suppose that each surface of the tooth is moulded in conformity with the distinctive type of the individual; that they occupy a definite position and perform a definite function.

The teeth are units of a whole and as such bear a definite relation to the organism, and anything affecting these units must have a corresponding effect upon the organism itself.

According to Fiske, "along with growing specialization of parts there is a growing co-operation of parts and an ever-increasing mutual dependence among parts."

Normal occlusion is our basis for diagnosis, and by this we mean that all the teeth must be present and occupying their normal position when the jaws are closed. It is only when this condition prevails that the teeth, the jaws, and the adjacent parts can perform their normal physiologic functions.

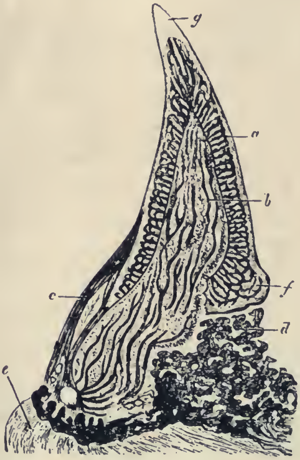
I shall ask your indulgence here in showing a few slides to illustrate some points in evolution and the effect of environment upon tooth forms.



SLIDE 1.—Lower jaw of shark (Tomes).

The shark is comparatively low in vertebrate life, and here we find teeth that are true calcified appendages. The dermoid scales are imbedded in a tough, fibrous mucous membrane which slides over the partly calcified cartilagenous jaw, in this way bringing successive rows of teeth into use as the old ones are lost.

The significant fact here is that the teeth have absolutely no connection with the jaw, being a specialized part of the skin.



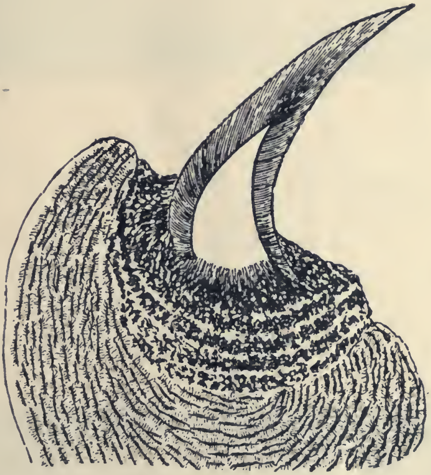
SLIDE 2.—Hinge tooth of hake (Tomes).

This is a more highly specialized form, being the hinge tooth of a hake and is prehensile in function, bending over to allow prey to enter, but assuming an upright position to prevent its escape.

This pillar, which supports the tooth in an upright position, is the first indication of a bony support.

In the python we find what is known as the bone of attachment. The desire for a more firm attachment is expressed as the tooth appears by a rapid deposition of bone spicules apparently from the jaw bone itself, securely imbedding the base of the tooth. This experiment of nature is, however, not adaptable to any but small teeth, as the rigid attachment makes them quite brittle and easily broken off. (Slides.)

The first indication of an alveolar socket is found in the reptiles, as could be shown in the jaw of a young alligator. This, however, is not a true alveolar socket, being simply a groove running lengthwise of the jaw, to the walls of which the teeth are more or less securely fastened by bands of fibrous tissue but not anchylosed.

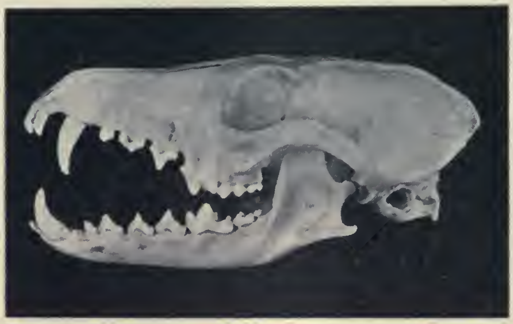


SLIDE 3.—Python bone of attachment (Tomes).

It is not until we reach the mammalian series that we find teeth implanted in sockets. And it is here, too, only that we find any very marked specialization in tooth forms.

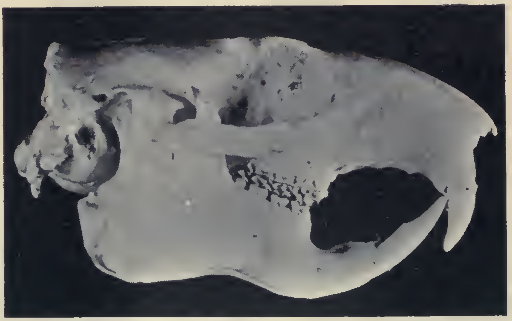
The teeth of the lower forms, as seen in fishes and reptiles, being entirely haptodont, or of simple conical variety and of endless succession, without any regularity of arrangement, their function being solely raptorial, no attempt being made at mastication, in fact, much of the prey being swallowed while yet alive.

So with the mammalian series is introduced the complex, highly specialized tooth forms and the double dentition. These complex forms are the direct result of the food habits and environment of the species.



SLIDE 4.—Carnivora—red fox.

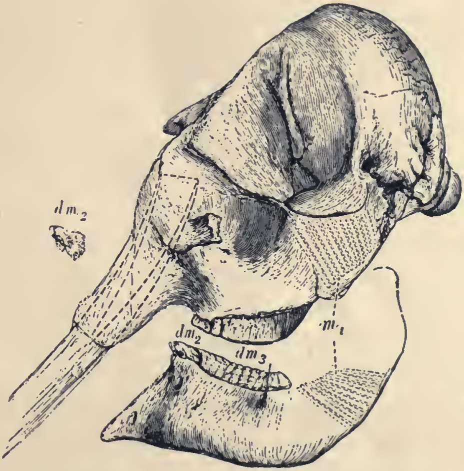
Slide 4 shows the characteristic dentition of the carnivora. Having very little use for the incisors, they are diminutive. The canine forms are large for prehension and combat. The most highly specialized are the fourth upper premolar and first lower molar. These teeth are known as the carnassals and are designed especially for cutting and work very much as a pair of shears. The molars are of little importance, hence underdeveloped.



SLIDE 5.—Rodent—woodchuck.

In the rodent the incisors are reduced to four in number and grow from a persistent pulp to equalize the wear due to habits of the species. The premolars and molars are arranged in rows and the food is ground up by a backward and forward motion of the jaws.

The dentition of the elephant is the most highly specialized of all dentitions, and presents two peculiarities, the enormous length of the incisor tusks and the displacement from behind forward of the molar teeth. The tusks are from persistent pulps and grow during the life of the animal. The molars are six in number in each jaw; in all twenty-four, but there are never more than four whole ones in position at one time. The new tooth, developing in the jaw as it is needed, gradually pushes the old one forward, and as it becomes worn it is broken off a piece at a time until finally lost. The new tooth, however, does not take its place at once, but is developed only as needed. This is admirably arranged to suit the food habits of the animal, for in this way he has at all times through life an efficient grinding mill.



SLIDE 6.—Elephant proboscidia (Tomes).

It is impossible to estimate the probable effect the evolution of tooth forms has had upon the evolution of species, but it has certainly been very great.

Variations which were beneficial to the species persisted. So, under the gradually changing conditions, any variations in tooth forms which better enabled the species to exist were persistent, while other forms disappeared because of their inability to adapt themselves to the new forms of food as the old disappeared. The effect of environment is strikingly illustrated by the presence in three parts of the world, entirely separated, of three animals having entirely dissimilar parentage but practically the same dentition, such as the wombat, habitat Australia, wholly marsupial; the chiromeys, of Madagascar, which is wholly lemurine, and the rodent, which inhabits all parts of the world.

The human dentition is the most complex, its functions more diversified, but it is not so highly specialized.

This is as should be expected when we recall that in the lower orders the law of the survival of the fittest prevails, while man has ever been able to adapt his food to suit his masticating apparatus or the whims of an imagination. And for this reason mastication with man has become more or less a habit. The lack of the proper exercise of the function results in a diminished efficiency of these units of the whole, the effect of which is so far-reaching that we can only conjecture as to the ultimate result.

This short review of comparative forms has shown us that in the lower forms the teeth were imbedded in a fibrous mucous membrane covering the jaw, which, during the evolution of species by various stages of adaptability became bone.

This is significant, for it is phylogenic evidence that the teeth are, and always have been, entirely independent of the bone, this bone having been evolved later solely as a means of support.

While bone is generally looked upon as a hard and unyielding substance, we must not lose sight of the fact that it is a form of connective tissue and, as such, is subject to change, this change being brought about by the direct application of mechanical force.

Let us briefly examine the structural arrangement of the maxillæ and mandible. The outer surface is composed of a layer of dense bone—the cortical plate—which in turn is composed of an outer layer of subperiosteal bone, and beneath this a much thicker layer of Haversian system bone. The thickness of this cortical plate varies according to the stress requirements.

The body of the bone is cancellous in character. The arrangement of the spicules is definite and is determined by the mechanical requirements of the part. Surrounding the roots and affording an attachment for the fibers of the peridental membrane is a thin sieve-like layer of bone, the cribiform plate, which is held in position by the spicules of cancellous bone. This is known as the alveolar socket and is continuous with the cortical plate at the margin of the alveolus.

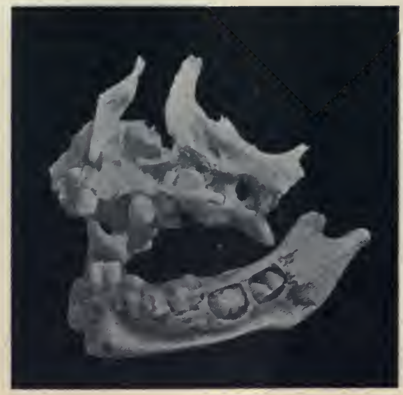
The alveolar process is that part of the mandible and maxillæ which is developed to support the teeth. It is continuous with the cortical plates of the jaws proper and it is impossible to differentiate one from the other. The fact remains, however, that the alveolar process disappears entirely upon its loss of function, or, in other words, upon loss of the teeth. In a cross-section of the bones of the face it is readily seen how the forces of occlusion, acting through the teeth, are distributed through the dental arches. Bearing this in mind, consider to what an extent malformations of the dental arches and consequent perversion of these functional forces must affect the bony structure of the face, particularly the nose and its accessory sinuses.

At birth all of the deciduous teeth and the first permanent molars are present in the jaws, while just lingual to them lie the germs for the corresponding permanent teeth. These teeth in their crypts occupy almost the entire body of the bone lying in the upper jaw against the floor of the nose and the orbit, and in the lower jaw even below the mental foramen.

The antrum is present only as an indentation in the wall of the nose. S. Noyes's investigation has shown us that as the tooth develops it pierces its crypt and the crown is carried forward by addition to the end of the root caused by the activity of the tooth germ, which continues until the tooth is fully formed. The crypt, however, does not disappear, but as the root grows so also does the crypt grow by the deposition of bone to its edges, becoming the alveolar socket.

The force which pushes the crown forward is directly traceable to the multiplication of cells in the tooth germ, and while this force is not well understood, it is certainly a positive one. It not only pushes the crown forward, but as the crypts are firmly braced to each other as well as to the cortical plates by these spicules of cancellous bone the force is transmitted in all directions, furnishing the necessary mechanical stimuli to the bone cells, which become active so that the supporting organ is developed as the tooth progresses.

There are at the same time other forces at work. In the mouth the force exerted by the growing tongue; the muscles of the lips and cheeks on the outside; the stimulating pull of the muscles of mastication and deglutition; the pressure of the air during inspiration and expiration. All these forces working in harmony and balance mould the jaws and dental arches to the form that nature intended, but let these forces fail to coördinate and inharmony results.



SLIDE 7.—Age one year (Noyes).

In Slide 7 you can see the effect of the forces that I have enumerated, and that it has not been simply an addition to the outside, but an interstitial growth in which there has been an entire rebuilding of the bone.

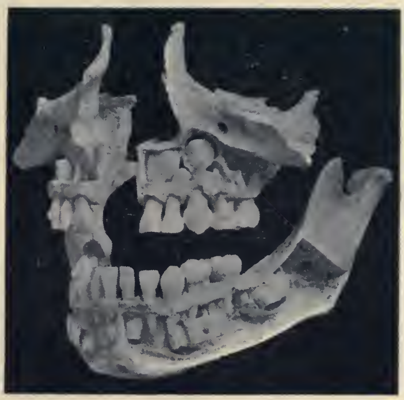
The force of tooth growth has been transmitted to the periosteum, covering the cortical plate, stimulating that formative organ to activity, which has then laid down subperiosteal bone to be converted into Haversian system bone and, as stated, when this becomes thicker than necessary, into the cancellous variety.

The upper and lower incisors have erupted the deciduous molars, have pierced their crypts and are ready to erupt, and the crown of the first permanent molar is well formed.

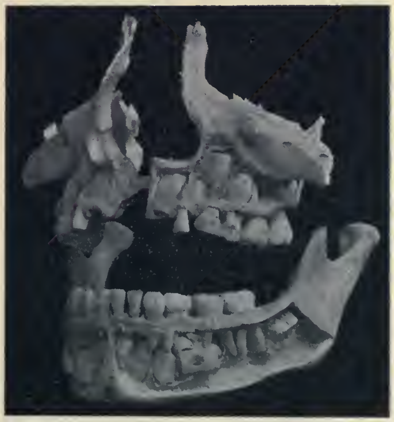
Note the relation of the roots of the growing deciduous molar to the cribiform tube and you will readily see how a lack of correlation between tooth growth and bone resorption will cause pressure upon the nerves and blood-vessels contained, with resultant nervous disturbances.

We have here arches with all the deciduous teeth present. The partly formed permanent teeth can be seen in their crypts just lingual to the apices of the deciduous teeth. As the permanent teeth develop the force exerted causes another rearrangement of the supporting organ.

As the crowns of the permanent teeth are pushed forward by the addition to the root they exert pressure against the roots of the deciduous teeth and resorption of the roots begins, but at the same time, the pressure coming from the lingual side, they are carried bodily downward and outward. The permanent incisors and cuspids being much larger than the corresponding deciduous, the growth force is greater, and the crypts being firmly braced against each other, the wedging effect of their descent, if the growth is normal, should be expressed by spaces appearing between the incisors and cuspids as the time for their eruption approaches.



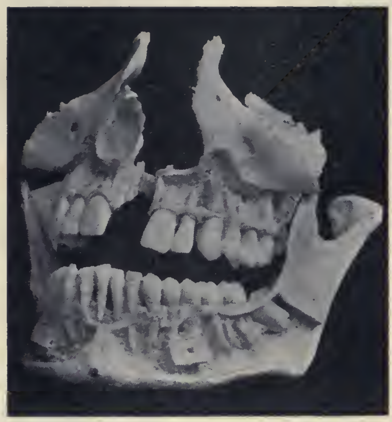
SLIDE 8.—Age three years (Noyes).



SLIDE 9.—Age six years (Noyes).

The sixth year marks the eruption of the first of the permanent dentition. Too much stress cannot be laid upon the importance of the first permanent molar of the human dentition. If properly placed they not only to a very considerable extent govern the eruption and placing of the rest of the permanent dentition, and the length of the overbite or distance the mandible shall assume from the maxillæ when the jaws are closed, but they are also the child's mainstay for mastication during the transitional period from the temporary to the permanent dentition.

It is well at this time to observe the position and shape of the development cuspid; how the crypt is braced against the malar process and what a tremendous amount of force it must exert in its wedge-like descent.



SLIDE 10.—Age fifteen years (Noyes).

At fifteen years we find all of the permanent teeth in position, with the exception of the third molar, which can be seen in its crypt. In the development of the molars as they are situated at the posterior part of the jaw, a great amount of force is exerted which is felt throughout the entire arch, causing the bone to grow downward, forward and outward above, and upward, forward and outward below.

After the teeth are all in position this growth continues until, if under normal conditions, they have assumed that position which harmonizes with the bones of the face and is determined by a perfect balance of the forces of occlusion. By the forces of occlusion we mean briefly the size and relation of the dental arches; the influence of the occlusal inclined planes of the teeth, of the muscles, and the interproximal contact points.

The great increase of distance from incisal edge to the floor of nose and orbit in the maxillæ and the mental foramen in the mandible as compared with that of the skull at birth is so evident that no more than a passing mention is necessary.

In conclusion, I might say that I have endeavored to show:—

(1) That the teeth appear first in the lower forms as true dermal appendages, which in man differs only in the degree of specialization, the enamel being derived from the ectoderm and the dentine from the mesoderm, the supporting organ in both cases being a form of connective tissue specialized to meet the requirements.

(2) That in the evolution of species the teeth were an important factor, their shape and size and position in the arch being the best adapted to food habits and environment of the species.

(3) That according to the teachings of Dr. Noyes, in the development and placing of the teeth of both the temporary and permanent dentitions, there is a constant building and rebuilding of their bony support which greatly influences the growth and development of the bones of the face; and that this growth is upward, forward and outward below, and downward, forward and outward above.

(4) That the object of orthodontia is to assist nature in bringing about these changes and establishing a normal balance of the forces of occlusion.

BIBLIOGRAPHY.

Noyes, F. B. "Dental Histology and Embryology."
Tomes, C. S. "Dental Anatomy."
Osborn, Raymond C. "The Evolution of the Occlusion of the Teeth," American Orthodontist, Vol. II., No. 1.
Cryer, M. H. "Internal Anatomy of the Face."

EXCRETION OF DIPHTHERIA BACILLI IN THE URINE.—Conradi and Bierast (*Deutsch. Med. Woch.*, August 22, 1912) as a result of personal studies which thus far have been fragmentary conclude that in about one-third of all cases of diphtheria virulent bacilli reach the urine and are often in position to propagate the infection. The danger of direct contact infection is slight because of the great dilution, there being relatively few bacteria present in a given bulk of urine. However, the latter should be disinfected as long as it is infected. Under exceptionally favorable conditions the urine might contaminate the milk vessels and so infect a milk supply.—*Medical Record.*

THE EFFECTS OF HEATED AND SUPERHEATED MILK ON THE INFANT'S NUTRITION (RECENT INVESTIGATIONS).*

BY HENRY L. COIT, M.D.,
Newark, N. J.

The physician will always be influenced in his teaching and practice by the results of his clinical experience, and while his teaching and practice should be justified by laboratory investigation and the results of research, his final judgments should also be influenced by clinical experience, always recognizing the difference between the ideal and the practical.

It seems somewhat paradoxical that I should array myself with those who endorse the heating or superheating of milk for infant feeding. I must state that no one could be a stronger advocate of raw milk, when it is ideally clean and safe, in the feeding of normal children. However, I have frequently been driven to the expedient of refining milk at efficient low temperatures and at high temperatures in treating sick infants and sometimes boiling it for several minutes, and I have been compelled to conclude that the heating of milk is not the menace to its nutritive values that champions of raw milk would have us believe.

My own experience covers a period of twenty-five years and my records include about six thousand feeding cases which, from the standpoint of heated milk and clean raw milk, I shall hope to study and report upon in the near future.

I shall not now offer any of my own conclusions, but refer to an English investigator, Dr. J. E. Lane-Claypon, authorized by and working under the direction of the British Local Government Board. The report has just been published (February 24, 1912) by Dr. Arthur Newsholme, Chief Medical Officer of Great Britain, and embodies the results of an inquiry undertaken in connection with the parliamentary grant for scientific investigations. The report is upon the available data in regard to the value of boiled milk as a food for infants and young animals, and is presented in five parts.

Part I. is an introduction in which the investigation is justified upon the intimate connection between the artificial feeding and excessive mortality among infants. The great superiority of breast milk or of milk of the same species over milk obtained from any other source, as a food for infants and young animals is established by experimental evidence and clinical experience and emphasizes the opinion that infants should be fed at the breast unless there is an urgent reason to the contrary.

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* Read before the Annual Meeting of the American Pediatric Society, Hot Springs, Va., May 30, 1912.

The introduction includes the author's plan for the investigation of the problem, which is dealt with under two main divisions:

(1) The comparative nutritive value of raw and boiled milk of the same species.

(2) The comparative nutritive value of raw and boiled milk of a foreign species.

Both divisions are influenced by the factors *of age of the young animal or child, the quantity and quality of the milk given and the environment or social condition.* The most important aspect of division two concerns the artificial feeding of infants with raw or boiled cow's milk.

The clinical requirements for the elucidation of the problem are a large number of healthy babies, under medical supervision, and the known social environment, who were fed for prolonged periods upon raw or boiled cow's milk.

Infant consultations provide the material of this type, from which sick babies were excluded, being referred to a hospital. The material used was under medical supervision, accurate records kept, the infants' food regulated and nutritive conditions noted. Further, the babies were visited in their own homes periodically, so that the social environment was known.

Among the material investigated, the most important was that courteously placed at the disposal of the author by Professor Finkelstein and Dr. Ballin, the Director of the Municipal Infant Consultation in Berlin.

Part II. deals with experimental evidence gathered from the work of various investigators on the relative value of raw and boiled milk of the same species as obtained from experiments upon lower animals. This includes the work of Gerlach, who, after failure with boiled milk, was successful after the addition of mineral salts to the boiled milk. It includes the work of Hittcher along the same line, in which he restored to boiled milk the quality of clotting with rennet by the addition of certain salts.

Reference is made to the work of Bang in Denmark, who has studied hundreds of cases, and has found the feeding of boiled milk entirely satisfactory. The experiments of Price and Doane in this country are also estimated in the author's conclusions. The work of Bang and Hittcher gives strong evidence that no serious loss of nutritive value is produced by boiling the milk of the same species.

The experimental evidence on the nutritive value of raw and boiled milk of a foreign species as applied to the lower animals includes the work of Bolle, Bartenstein, Bruning and Moro upon guinea-pigs, and concludes that these animals are not suitable ones upon which to carry out feeding experiments.

The work of Keller on mice is referred to, and the author's own work on rats at the Lister Institute for Medical Research, the work of Bruning and Moro on rabbits, and the work of Rodet, Keller, Bruning and Moro on dogs, Moro showing that dogs fed on human milk remained alive, but were in a very miserable condition, whereas dogs fed on cow's milk did extremely well. These results by the same observer on rabbits show that it is very important to use the species of animals whose milk is suitable for the species whose growth is being investigated.

Reference is made to the work of Chamouin, Grunbaun and Vincent on kittens, and the work of Bruning and Bamberg on pigs. Reference is also made to the work on identical lines with goats by Bruning and Bruckler, in which it was found that goats did fairly well on cow's milk, but results are very inferior to those obtained with mother's milk, and that there was a distinct advantage in giving it boiled.

Summarizing the results of experiment on lower animals, the author states:—

(1) That there is no evidence to show that boiled cow's milk is markedly inferior to raw cow's milk, as a food for young calves, at any rate after the first two days of life (cp. Bang).

(2) That the salt content is of great importance (cp. Hittcher and Gerlach).

(3) That, if young animals are fed on the milk of a suitable foreign species, they appear to thrive somewhat better if the milk is given boiled than if given raw, the only exception being in the case of germ-free milk (cp. Bamberg).

(4) That in those cases where the health of the animals was inquired into, after the cessation of the experiment, no difference could be detected in the animals fed by different methods of artificial feeding.

(5) All the animals fed by different methods of artificial feeding were inferior to the breast-fed animals, both at the time of the experiment and afterward.

PART III. includes clinical evidence as adduced by many authors who have worked with scanty material in institutions and hospitals. The author regards most of this evidence as of doubtful value since most of these children show definite wasting; some of them had reached the later stages of atrophy, and believes that its importance is to show how far the metabolism of such children is directly comparable with that of healthy children, but as to the relative adjustability and nutritive value of the food given, it would be more likely to be more pronounced in the case of a sick than of a healthy child.

These conclusions are emphasized by the facts:—

(1) That different observers are not agreed upon the relative value of raw and boiled milk in the treatment of atrophic children.

(2) It is usually difficult in hospital practice to keep the children under observation for a sufficiently long period to study to the full the effects of the observations made in the hospital.

(3) The variation in the details in the source and preparation of the milk given, and as to the understanding of what sterilized milk really is.

(4) The variations under different observers upon different classes of babies in the quality of the milk use. It is only by feeding babies on raw and boiled milk of the same quality that any reliable evidence can be obtained.

The authors referred to who, in institutions, fed infants on boiled milk of the same species were Moro, L. F. Meyer, Potpeschnig, Bering, Müller, Finkelstein and Professor Thiemich, of Magdeburg. The work of the latter, although yet unpublished, was available to the author. He states that: "In my wards the milk of all the new wet-nurses is given boiled only until Wassermann's and Stern's reactions have been carried out."

On this system he has tabulated a great number of children who have improved as advantageously on boiled human milk as happens with raw human milk. In a number of cases raw and boiled human milk have been given alternately and systematically for various periods with the same results.

The report deals also with the clinical evidence in regard to infants fed on raw and boiled milk of a foreign species, and the following authors are quoted: Ulig, Leeds and Davis, Monrad, Variot, Czerny, Halipre, Hahlfield, Vincent and Finkelstein. The latter investigator carried on his work over prolonged periods, on both healthy and atrophic children, as well as on those suffering from acute disturbances. Finkelstein concludes that "no definite distinction between the results obtained by feeding on raw and boiled milk respectively could be detected." If Finkelstein's figures as seen in Group I (a) are examined carefully, it will be seen that there is a balance in favor of boiled milk.

Metabolism experiments of Bendix, Lange and Koplik are given. Reference is made to the alleged production of rickets and infantile scurvy by boiled milk.

In the summary of the experimental clinical evidence which was obtained from institutions and hospitals, the author concludes that the balance of evidence may be said not to show any decided superiority on the side of either raw or boiled cow's milk as a food for infants.

PART IV. deals with the method and results of working up the Berlin material and is treated under the heads of:—

The Source of Material.
The Milk Supply for the Consultations.
The Notes taken at the Consultations.
The Selection of Material.

Under this last head, it was found necessary to deal with two main series of infants:—

(1) Healthy babies of the average artisan class fed on milk in various forms in order to have a control consisting of the average baby.

(2) Healthy babies of the same class, but fed only on boiled cow's milk in order to study the difference, if any, produced on the average baby of the class by feeding it exclusively on boiled milk, as compared with the infants of class 1.

In considering the babies of this first class, it appeared that far the larger portion were fed on the breast, and that all the others were fed on boiled cow's milk. There were a very few cases of mixed feeding on the breast and on boiled milk, lasting over a few weeks.

This was of course foreseen, since the material which was to be used was that of an infant consultation where the babies were, if possible, fed on the breast and, failing that, on boiled milk.

Hence, if the babies attending the consultation had been taken seriatim, regardless of the variety of feeding they were receiving, and had been utilized for preparing control statistics under the first head given above, the results would have been complicated by the presence of a considerable number of babies of the second class, which was required to be a class by itself. It was decided to exclude from the control series all babies who had received less than four months' breast feeding.

The author then makes an analysis of the material used, and presents very complete results in tabular form, followed by a critical review of the statistical methods employed.

Table I. shows the age of first attendance and of leaving the consultation of the babies of the control or breast-fed series.

Table II. shows the age of first attendance and on leaving the consultation of the babies of the boiled cow's milk series.

Table III. shows the average weights of the babies of the control or breast-fed series, grouped in periods of eight days and the number of observations made.

Table IV. shows the average weights of the babies of the boiled cow's milk series, grouped in periods of eight days, and the number of observations made.

The average weights found and shown in Tables III. and IV. are plotted on Diagram I.

About 12,000 observations were made.

Analysis of Diagram I: Diagram I. shows that a considerable divergence between the two curves starts in the early days of life and continues well marked up to about the two hundred and eighth day, after which it disappears fairly rapidly. The possible difference between the average weight of breast-fed and boiled cow's milk fed babies of the same age being due to error of sampling, was carefully examined and deduction drawn.

Table V. shows distribution of 345 observations on the weight of 504 infants in relation to the food between the one hundred and thirty-seventh and one hundred and forty-fourth day of life, which is used to check up possible error in conclusions.

Table VI. shows the distribution of the observations of the feeding of infants in relation to the ages.

Table VII. shows the percentage of the rate of increase for each period of eight days of the babies of both series up to the age of eight months. The results given in Table VII. are plotted on Diagram II. Both series show an extreme irregularity in the rate at which the weight increases, and after the first two estimations, it would be difficult to point out any marked difference between the values of the two series.

Table VIII. shows the percentage of the rate of growth of the babies of both series, starting from the second eight-day period of life, the control series being the breast-fed babies, and the other series being babies which were fed on boiled cow's milk. The results shown in Table VIII. are plotted in Diagram III., which shows that as regards the rate of growth there is little to choose between the two series. The babies fed on boiled cow's milk doubled their weight at the one hundred and eighty-fifth to one hundred and ninety-second day, or a fortnight earlier than the breast-fed babies, but they started with usually a lower weight.

Table IX. shows the percentage of the relationships between the average weights of the babies of the two series: Series I. consisting of the breast-fed babies, and Series II. consisting of babies fed on boiled cow's milk. This shows a more favorable result than those obtained in the feeding experiment on animals which received the milk of a foreign species, which renders it doubtful whether the result could be surpassed by feeding babies on raw cow's milk.

Table X. shows the average weights and the number of estimations of 78 babies who were never breast-fed, and of 41 babies who were breast-fed for eight days or less.

Table XI. shows the average weight of 130 babies, exclusively breast-fed up to two hundred days of age, and of 119 babies, of whom 78 had never been breast-fed, and of 41 who were breast-fed for less than eight days.

The figures obtained by estimating the weight of the 130 breast-fed and the babies fed exclusively on boiled cow's milk show the main characteristics as the curves of the original series of babies as plotted in Diagram I. The divergence is more accentuated, but the tendency of the two curves to approach one another at about the two hundredth day begins to appear after the one hundred and sixtieth day. The average weight and the results are plotted on Diagram IV.

Table XII. shows the percentage of growth of 119 babies who had never been breast-fed, and of 130 babies who were exclusively breast-fed, starting from the average weight at the end of the sixteenth day of age, and continuing up to the time at which they doubled their weights. Both breast-fed babies and those fed on boiled cow's milk doubled their weights at the one hundred and ninety-third to two hundredth day of life. This is plotted on Diagram V.

SUMMARY OF RESULTS OBTAINED IN PART IV.

The Berlin figures dealt with in this part of the report show that given circumstances similar to those of the consultation from whence the figures are taken:—

(1) Infants fed on the breast show a higher average weight than infants fed on boiled cow's milk up to about the one hundred and eightieth to two hundred and twentieth day of life. After this age the difference in average weight disappears.

(2) This difference must be attributed to the method of feeding, and not to differences in the social condition of the infants.

(3) The difference in average weight is most marked in the first sixteen days of life. This difference must be attributed to the different method of feeding, and not to any possible "error of sampling."

(4) After the first sixteen days the average increase in body-weight is almost identical in both series of babies.

(5) The deficit of average weight of the babies fed on boiled cow's milk below those fed on the breast does not reach 10 per cent. at any period.

PART V. SUMMARY AND CONCLUSIONS.

The balance of evidence, both experimental and clinical, points in the main to the same conclusions. Both lines of research show:—

(1) That there is apparently no serious loss of nutritive value produced by feeding an animal on boiled milk derived from an animal of the same species. At the same time it must be pointed out that the published evidence on this point is scanty.

(2) That, when an animal is fed on the milk of another species, the milk from which has been found to be suitable for this purpose, such small differences as have been found in the nutritive values of raw and boiled milk have been in favor of boiled milk.

(3) That the milk of the same species has a considerably higher nutritive value for that species than the milk of any other species so far investigated.

The evidence dealt with throughout this report emphasizes very forcibly the importance of breast-feeding for the young of all species, and shows the special importance of breast-feeding during the early weeks of life.

When artificial feeding has been employed in animal experiments, boiled milk of a foreign species has given more satisfactory results than similar milk raw. The Berlin figures dealing with infants fed on boiled cow's milk, give extremely favorable results, and in view of the evidence collected in this report could scarcely be expected to be surpassed had raw cow's milk been used.

It may be again pointed out that the Berlin babies who are artificially fed in connection with the consultation receive milk of a known excellent quality. The excellence of the results obtained in Berlin are almost certainly largely due to the care and supervision exercised at and through the consultation.

277 Mt. Prospect Avenue.

Blood Serum in the Treatment of Hemorrhage.—G. H. A. Clowes and F. C. Busch (*Boston Medical and Surgical Journal,* January 2, 1913) emphasize the fact that blood serum is of considerable value in the treatment of all forms of hemorrhage due to low blood coagulability resulting from a diminished thrombin content. Human serum is in no wise superior to that of a variety of animals. Blood serum precipitated by means of a suitable mixture of acetone and ether is fully as effective as fresh serum, if not superior to it. Precipitated serum is freely soluble and possesses the advantage over fluid serum of being sterile, always available, and retaining indefinitely its capacity to stimulate coagulation of the blood. The product obtained from horse serum appears to yield more uniformly satisfactory results than that obtained from the sera of other animals, and exerts no deleterious effect. The determination of the rapidity with which sera and solutions of precipitated sera at comparable concentrations cause coagulation of citrated blood plasma affords a simple means of estimating the relative activity of the preparations in question, and consequently of standardizing precipitated sera for clinical purposes.—*Medical Record.*

LUMBAR PUNCTURE, AN AID TO DIAGNOSIS. ITS VALUE IN RELIEVING CONVULSIONS.

BY LOUIS FISCHER, M.D.,
Attending Physician, Willard Parker Hospital, etc., New York.

The frequency of convulsions in children prompts me to call attention to the necessity of a lumbar puncture as an aid to an early diagnosis of this very important symptom.

Intestinal intoxication is a frequent cause of cerebral congestion, resulting in convulsions. But more commonly convulsions are the initial symptoms of an infectious disease, a forerunner of pneumonia, occasionally an early manifestation of scarlet fever, measles or diphtheria. One must not overlook the frequency of convulsions in the beginning of a cerebrospinal meningitis, a tuberculous meningitis, or some malignant form of cerebral manifestation. The diagnosis is therefore important, and the sooner we locate the origin the more easily will we be able to lend therapeutic aid. Convulsions recur. Because of their recurrence we can try to control their frequency or prevent their return. This can be accomplished by reducing intracranial pressure. For this purpose lumbar puncture is indicated.

Method of Making Lumbar Puncture.—The subarachnoid space is frequently tapped for diagnosis and therapeutic purposes. Either the space between the third and the fourth or the fourth and the fifth lumbar vertebræ may be chosen. The child is placed on either side with the spinal curve toward the operator, in this way spreading the vertebræ. An imaginary line drawn through the crest of the ilium to the spine is an easy means of locating the place to puncture.

Kind of Needle Required.—In making a lumbar puncture we should use such a needle as would be required in making a puncture aspiration in empyema. The needle should be pushed a little upward and forward until it enters the spinal canal, then the stylet should be withdrawn. If the fluid does not escape through the needle, then withdraw it slightly and reintroduce the stylet to dislodge any obstruction in the lumen of the needle. Make the puncture as simple as possible rather than lacerate the tissue around the vertebral column and cause bleeding by lateral movements of the needle.

Amount of Fluid to be Withdrawn.—For diagnostic purposes 15 to 20 c.cm. should be withdrawn if the fluid is watery and clear. If the spinal fluid is turbid then the more we can withdraw, the better. I have withdrawn as much as 50 to 60 c.cm. at one time.

The site of puncture should be closed with a strip of adhesive plaster, or with a drop of collodion.

Local Anesthesia.—Ethyl chloride in the form of a spray is useful in very sensitive children. It is not necessary to have general anesthesia during this procedure. General rules of asepsis must be strictly applied to the child's skin, the operators hands, and to the needle used.

Dry Tap in Lumbar Puncture.—We may have a dry tap:—

First. If the caliber of the needle is small, and the spinal fluid very thick.

Second. If adhesions are present at the base of the brain, preventing the passage of fluid from the ventricles to the subarachnoid space.

Third. If a successful puncture has been made, a dry tap may follow, due to inflammatory adhesion caused by the previous introduction of the needle.

Fourth. The closing of the foramen of Magendie is the most frequent result of the inflammatory process, resulting in dry tap.

Fifth. A fibrin clot, or the presence of the cord in front of the needle may prevent the outflow of the cerebrospinal fluid.

To be sure that we are in the spinal canal if a dry tap results, leave the needle *in situ* and introduce a second needle two spaces lower. Sterile water if injected through the upper needle will flow out of the lower needle, proving that we are in the spinal canal.

The spinal cord in infants terminates about the level of the lumbar vertebræ. The introduction of the needle is simplest between the third and fourth, or the fourth and fifth lumbar vertebræ. In these interspaces there is no cord, hence no injury can follow. An imaginary line drawn through the crest of the ilium corresponds to the fourth intercostal space.

The points to note are: The turbidity or clearness of the spinal fluid, and whether the fluid was tapped under great or under no pressure.

We must not be satisfied with a macroscopic examination, but must depend on the microscopic findings. Apparently clear fluid may be present in the early stage of cerebrospinal meningitis, and by centrifuging the fluid the diplococcus intracellularis may be found. In like manner careful search will frequently show the presence of the tubercle bacillus in the early stage of tuberculous meningitis.

This simple remedy is a rapid means of controlling convulsions, and is far more efficacious than the use of chloroform anesthesia.

Next in importance is to relieve the intracranial pressure by lumbar puncture, an injection of a pint of soap-water should be given to empty the rectum. If the child can swallow, give 2 grains of calomel, followed by teaspoonful doses of rhubarb-soda, in all about six doses. This eliminative treatment should be given before any nutrition is ordered. Large quantities of water may be given. An ice-bag should be ordered to be applied over the anterior fontanel. It is important not to move a child too much during a convulsion, for handling the limbs will frequently provoke a spasm.

162 West 87th Street.

MALIGNANT TUMORS IN CHILDHOOD.—Usener (*Deutsch. med. Woch.*, November 21, 1912) first refers to Steffen's monograph on this subject, published in 1905. He investigated the material of the Leipzig Children's Hospital during the years 1907-8 for additional material of this sort, and out of 173 tumors of all kinds found four which were malignant. These were all sarcomata, affecting respectively the clavicle, right kidney, abdominal wall, and jejunum. The ages of the children ranged from four and one-half years to thirteen years. Steffen collected notes of 33 cases of sarcoma of the long bones, in only one of which the clavicle was the seat. Malignant growths of the kidney, on the contrary, are frequent in early life and Steffen mentions 222 cases. These are spoken of as comprising sarcoma, carcinoma and mixed growths, the term hypernephroma not being mentioned in this connection. The locations in the integument and intestine are both unusual. Some thirteen tumors developing in some portion of the small intestine have been recorded. In regard to the cutaneous site the few cases on record may have been congenital. —*Medical Record.*

UNUSUAL COMPLICATIONS OF INFECTIOUS DISEASES IN CHILDHOOD, WITH REPORT OF CASES.*

BY ARTHUR STERN, M.D.,
Elizabeth, N. J.

There have come to the observation of all of us certain complications in infectious diseases, which are not preëminently mentioned in text-books and which are of such character that they are likely to escape our attention were it not that they manifest themselves through serious symptoms and the delay of the recovery of the already weakened patient.

As the literature on some of these complications is very meager we sometimes have to depend entirely on our own interpretation of the symptoms and the therapeutic management of each individual case will naturally be left to our own best judgment. It has been my good fortune to see a few cases of this nature lately, which I shall take pleasure in reporting to you.

Cases No. I. and II. Sister and brother.

Helen W., eight years old, took sick with mumps December 17, 1911, at a time when we had quite a prevalence of this disease. The attack seemed to be a mild one and took its normal course until December 22d, when her mother told me that the child had vomited since noon, had a high fever and seemed to be very weak. Temperature at night was 103°F, and the child gave a very sick impression. She complained of severe pain in the upper abdomen and vomited every particle of solid or liquid food. On examination there was a zone of extreme tenderness above the umbilicus which was especially marked on deep pressure. I would locate the area of pain parallel to the pancreas; there was no pain in the lower part of the abdomen, especially in the region of the ovaries. This condition lasted about three days, when the vomiting stopped gradually, the temperature came down to normal and the child seemed to be about well when, on December 31st, she complained of double vision—saw two lights, two mothers and so on. This condition lasted again two weeks and then the child was normal.

On January 4th the mother notified me that she had a telephone message from New York, where her oldest boy was in school, a brother of the patient whose history I have just recited. The doctor notified her that he was suffering from mumps. The mother went over and brought him home, where he came under my care.

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* Read before the Annual Meeting of the New Jersey State Pediatric Society, June, 1912.

Fred W., sixteen years old, was taken sick January 2d with mumps. He appeared to be in good shape when he arrived here and had no complications whatsoever. On January 9th the mother notified me over the 'phone that he seemed to be very dizzy and could not lift his head from the pillows. When I saw him, he had a marked bradycardia for a boy of his age, a pulse of from 30 to 38 a minute, temperature per rectum 99.5 and complained about headache, extreme dizziness, especially when he opened his eyes. He had had no medication whatsoever, so I ordered some bromides to quiet him. The next morning his temperature was normal per rectum, but the extreme dizziness kept right on and he felt very sick to his stomach and vomited at intervals. There was a slight rigidity of his neck very marked nystagmus of both eyes, and especially of the right, and he stated that the hearing of the right ear seemed to have become poor. From this day on for the next four weeks the boy gave us a great deal of anxiety caused mainly by his extreme dizziness, vomiting, lack of appetite, loss in weight and the slow pulse rate, which very seldom was higher than 40. He could only lie on his left side, and as he, a tall, slender boy before his sickness, kept on losing flesh, he became very much emaciated, and we had great trouble in preventing bed-sores on his left arm and hip. We were not able to get him out of bed before four weeks from the onset, and then only with great care, as the slightest movement would make his head go around and, as he explained it, the whole room move around with him. He could not hear with his right ear at all. The intelligent nursing by his mother brought him around gradually, but after weeks the nystagmus was still noticeable and a great weakness present.

I attach the observations of this case in regard to the condition of the eyes and ears made by Dr. Charles Schlichter, of Elizabeth, which he kindly furnished for this paper:—

Helen W. About December 20th she had a severe attack of parotitis. This was complicated by a metastatic condition in the abdomen. A few days later she began to complain of diplopia. This diplopia was due to a paresis of the right internal muscle, showing a lesion of some of the fibers of the inferior branch of the third nerve. This had gradually cleared up, and when I last saw her had almost entirely disappeared.

On January 12, 1912, I was called by Dr. Stern to see Frederick W., who was a student. The history was that he was taken ill with parotitis on January 3d. The attack was very severe, and on January 11th he noticed that his hearing was impaired. He complained of some low-pitched tinnitus in the right ear and said the ear felt full. Examination showed an acute catarrhal otitis with some fluid in each middle ear. He was able to hear a watch in the left at three and a half feet, the bone conduction being good on that side. On the right he was unable to hear the watch. The air conduction and the bone conduction with tuning fork C were extremely poor. He had no nystagmus and complained of dizziness. Later he developed a nystagmus toward the right; he became very dizzy when sitting up in bed or even turning on his side. He became nauseated and vomited each time he turned on his side and was always most comfortable when lying on the left side. This continued for a number of weeks and gradually cleared up. On March 4th I saw him again. The hearing on the right side was lost and I advised that he be given K. I., which, together with pilocarpin, had been the treatment. Diagnosis, acute serous labyrinthitis with exudation.

A late examination made by Dr. Wendell C. Phillips, of New York, finds the same condition of affairs and no improvement in hearing.

In going over the literature on epidemic parotitis I was astonished to find so little in regard to the complications of this disease; it almost seemed to me that most of the writers did not find it worth while to bother with the subject, or stated that the disease was mild and, with the exception of an occasional orchitis, did not need any further interference.

One of the later text-books on children's diseases edited by Feer, in Germany, devotes four pages to parotitis epidemica and mentions a great many complications in the course of the disease. He states that paralysis of some muscles of the eyes has been observed, which would cover the symptoms in Case I. and that in children of female sex occasionally a complex of symptoms arises, with vomiting, abdominal pain and sensitiveness in the neighborhood of the pancreas, which one might be able to call a complicating acute pancreatitis. French authors, he states, speak of a complicating serous meningitis with opisthotonos, convulsions and delirium, and he continues that a complicating acute labyrinthitis, with following deafness, is extremely rare. Our Case No. II. had all the symptoms of a serous meningitis and a complicating acute labyrinthitis, as he had opisthotonos, marked nystagmus and deafness following.

The importance of the complications in parotitis is shown by an editorial in the *Medical Record* of June of this year. The article states that Schmackpfeffer in 1877 pointed to the close relation between mumps and pancreatitis, and it cites Freund, who reported, in the *Wien. med. Woch.*, 1911, No. 49, 8 cases with a complication resembling pancreatitis. The article deals then with the complicating meningoencephalitis, inflammation of various parts of the visual apparatus, nephritis, endo- and pericarditis, peritonitis, arthritis, otitis and even urethritis.

It further states that H. Zade, in *Archiv. für Kinderhk.*, in 1912, reports a case with meningeal symptoms and bradycardia exactly as my patient. His case recovered in ten days.

CASE NO. III. Edward L., four years old, was taken sick with whooping-cough about December 1, 1911. At the height of the disease, around January of this year, a bronchopneumonia complicated the sickness and the boy rapidly became very ill. His respirations went up to 90 and 100 a minute, his lips and his finger-nails became blue and the typical attacks of whooping had almost disappeared, always a bad prognostic sign in this disease. His mother, a Polish midwife of more than ordinary intelligence, worked with him all day and night and followed all instructions, and I think that his recovery is almost entirely due to her constant painstaking care during his long illness. I advised the interrupted use of inhalations of oxygen at half-hourly intervals day and night, and the daily applications of mustard as advised by Heubner, of Berlin, which consists in the application of a mustard towel around the body covered by a flannel towel until the skin becomes scarlet red. The mother, not contented with one application, used them twice daily in her effort to save the boy, until the skin was in a constant condition of acute dermatitis. During the following weeks he had a very stormy time of it; his condition went up and down with irregular temperatures between 100° and 104° F., and respirations of from 60 to 120 and a very irregular small pulse, but finally he grew somewhat better, the lips showed normal color and he started to whoop again and we thought we had won the fight for the boy, who was now very much emaciated, when suddenly, one evening, the mother telephoned for me, telling me that the boy had had a severe convulsion in the afternoon and when he became conscious again afterward he complained of a terrible pain in his abdomen. He had been vomiting ever since and screamed about his stomach. When I saw him late in the evening he was lying on his back, had his legs drawn up and, crying, held his stomach with his hands. On examination I found the abdomen to be rigid all over, very sensitive to touch. The temperature was 104°F. in the rectum. It had been normal for several days. During the next days an exudate appeared around the umbilicus of the size of a child's head, which was very sensitive and could be easily mapped out in the thin-walled abdominal cavity. The temperature gradually disappeared, until about ten days later one morning the mother told me that the boy had had severe diarrhea of bad-smelling stools which looked like matter, and since that time he had much improved. The abdominal tumor, on examination, had almost disappeared, and the child felt much better. From now on convalescence was comparatively rapid, except for the contracted knee joints from the long stay in bed and the continuous drawing up of the legs during the last two weeks, and with proper feeding and massage we had him well around the latter part of March, a duration of four months from the onset.

In looking over the history of this case I do not have to comment on the whooping-cough and its complicating pneumonia, which, although the latter was extremely severe, is in no way unusual, but the abdominal complication is rather outside the ordinary run of complications. The only explanation I have to offer is a metastatic process similar to a peritonitis caused by the pneumococcus, which formed an encapsulated abscess, which finally perforated into the bowel. Such cases are certainly very rare, and I have not been able to find a case similar to this mentioned anywhere. I must say that the recovery of this boy, who was extremely emaciated, was an agreeable surprise to me.

224 East Jersey Street.

THE USE OF ANTISTREPTOCOCCUS SERUM LOCALLY IN THE TREATMENT OF VACCINAL ULCERS.

BY LEWIS A. SEXTON, M.D.,
Willard Parker Hospitals, New York City.

I feel sure the profession will welcome any form of treatment that will shorten the duration of and lessen the number of infected vaccinal ulcers.

We do not have to look far into the past to see whole provinces practically depopulated by the scourges of small-pox.

With the advent of vaccination we note a sudden and continuous decrease in the number of epidemics and the percentage mortality; until to-day small-pox epidemics are practically a thing of the past.

This condition can only be accounted for in one way, viz: through the influence of vaccination.

We have vaccinated in the Willard Parker Hospitals, during the past four years, 45,735 persons. Naturally out of this vast number we have had many infections, due in every instances, I should say, to the introduction into the wound of some extraneous microorganisms which produced the tissue necrosis.

I know of no condition which offers greater resistance to ordinary treatment than vaccinal ulcers, and it was with a view to lessening the number and persistence of these that we began the use of serums locally some three and one-half years ago. From the first use of antistreptococcus serum we noted a marked improvement in these indolent, punched out vaccinal ulcers, and I have yet to see one that has not responded readily to the constant application of antistreptococcus serum used locally in the form of a wet dressing.

The wound is filled with the serum, this is covered with a small wet dressing of same, and over this is placed an oiled silk dressing in order to maintain the moisture as long as possible. The dressings when dry become very hard and stiff. In order to obviate the unpleasantness caused by this we remove the oiled silk and remoisten the dressing, without disturbing it, three or four times daily.

The rapidity with which these indolent ulcers respond to this form of treatment is remarkable.

We have tried various other serums, including normal horse serum, but the results from their use have not been satisfactory.

SOCIETY REPORTS.

THE PHILADELPHIA PEDIATRIC SOCIETY.

January 14, 1913.

THEODORE LE BOUTILLIER, M.D., PRESIDENT.

URTICARIA.

DR. ELEANOR C. JONES showed a boy of two and one-half years with urticaria pigmentosa. The primary lesions were those of urticaria and appeared at the age of two and one-half weeks. They promptly disappeared and then reappeared, commingled with bullæ, which dessicated and were covered with crusts. Finally the lesions became pigmented. There has never been itching. The entire cutaneous surface is now covered with brown lesions, papular in character, varying in size and shape from small rounded or irregular oval to large confluent patches. The eruption, while most marked on back, chest and abdomen, extends to palms and soles and may be noted on the penis and ears. Wassermann reaction was negative. Staining a section of the skin showed mast-cells in the corium. As these are characteristic of the disease, their presence confirms the diagnosis. The child is anemic, suffering from intestinal indigestion. The urine until recently has showed indican in large quantities. Studies in metabolism are now being made upon him by Dr. Martha Tracy. No successful treatment has yet been found, as the patches seem to fade out about the age of adolescence.

Dr. Jones also presented a case of urticaria factitia, dermographic urticaria, in a girl of eight years. She belongs to a neurotic family and is herself very nervous.

CASE FOR DIAGNOSIS.

DR. S. McC. HAMILL showed a case in which the diagnosis had been that of tuberculous meningitis, this diagnosis being based upon the presence of all of the symptoms usually found in this condition. The examination of the cerebrospinal fluid, made immediately upon admission, and upon three subsequent occasions, did not, however, show anything abnormal.

The patient had been ill for a period of two weeks prior to admission, and continued to grow more ill for a period of ten days after admission, at which time the condition was quite alarming. Following the last spinal puncture, on which occasion 20 c.c. of cerebrospinal fluid were removed, the child began to improve, but inasmuch as there had been no pressure indicated on the occasion of the previous punctures, and inasmuch as the fluid did not come out under pressure at the last puncture, Dr. Hamill assumed that this improvement was purely coincidental.

At the height of the illness there was complete ptosis of the left eyelid, and partial paralysis of the muscles of the right side of the face, in addition to marked generalized rigidity of the arms and legs and marked retraction of the head, irregular Kernig's sign, intermittent exaggeration of the knee-jerk, and the presence of the Babinski reflex. There were a number of additional phenomena of tuberculous meningitis noticed at various times in the course of the illness. In addition to the negative findings in the cerebrospinal fluid, the von Pirquet tuberculin test was negative on two occasions. The Wassermann reaction was negative; the urinalyses were negative, and there was no alteration in the blood picture.

At the time the patient was shown, which was about six weeks from the beginning of the illness, recovery was complete, with the exception of a very slight drooping of the left eyelid.

DR. JOHN A. KOLMER said that, in examining cerebrospinal fluid, he relies a good deal upon the total cell count or the Noguchi butyric acid test for increased globulin content and a lymphocytosis in diagnosing tubercular meningitis. The development of a fibrin coagulum in the fluid aids very much in finding tubercle bacilli, but this frequently requires prolonged search and may then prove unsuccessful.

DR. C. Y. WHITE said that he did not believe that it was very difficult to find the tubercle bacilli in the cerebrospinal fluid. The fluid should be allowed to stand at least twelve hours; the film that forms should be carefully floated off on a glass slide, teased if necessary, dried and stained as usual for the tubercle bacillus. If a lymphocytosis is found, one should continue the examination, and if failure to find the tubercle bacillus a second specimen should be obtained for examination. The tubercle bacilli will usually be found in the second specimen.

DR. HAMILL was entirely unable to explain the phenomena. At his request, the case had been studied by Dr. C. W. Burr and

Dr. J. H. W. Rhein, both of whom concurred with the original diagnosis, and neither of whom was able to give a satisfactory explanation of the condition in the light of the recovery.

THE BACTERIOLOGY OF DIPHTHERIA.

Dr. Kolmer read part of the Pediatric Society Prize Essay for which he was awarded $100. He attempted to differentiate among the various types of diphtheria bacilli, and especially between the pseudodiphtheria and true diphtheria bacilli, by complement fixation reactions. Immune serums were produced in rabbits by eight different strains and tried out with homologous antigens. The various serums and antigens were then interchanged. The results indicated on the whole that such differentiation between the members of the group was not decided. Similar experiments with raw diphtheria antitoxin obtained soon after bleeding showed no relation between the degree of complement fixation and antitoxin content. The results of the work indicated that Hofmann's bacillus belongs essentially to the diphtheria group and is not a separate entity in the sense of being totally unrelated. It is probable that this bacillus is an example of "mutation" and is capable of transmitting its new qualities through an indefinite number of generations. The types of bacilli were studied and recorded in 253 cases of diphtheria. The granular varieties were found to predominate in the largest proportion of cases of clinical diphtheria whether the disease be located in the nose, pharynx or larynx. Cultures of these cases were also studied in reference to changeability of types during the course of the disease. The results of 237 animal inoculation tests were also given. It was found that the granular types gave the highest percentage of positive tests. No matter how long they persist in the throat after recovery, they should be regarded as dangerous until proven otherwise. The value of animal inoculation tests was especially appreciable when dealing with solid types of bacilli when these persist in the tissues over a long period of time or when found in contact and carrier cases. Acid production tests were conducted with 62 strains. Dr. Kolmer advocates the following scheme, modified from the Wesbrook, for the bacteriologic diagnosis and management of diphtheria. (1) Hold the granular types, A, B, C, D and E as significant, regardless of the clinical condition or history of the patients or the presence or absence of other types. Cultures of these types from carriers or from persons running a prolonged list of positive cultures should be tested for virulence. (2) Regard the barred types, A_1, B_1, C_1 and D_1 as doubtful unless granular bacilli are also present, when a positive diagnosis is given. (3) Hold the solid types, A_2, B_2, C_2, and D_2, as doubtful and request another culture. If granular bacilli are present a positive diagnosis is given. If subsequent cultures show the same solid types and if the patient is free from clinical evidence, they may be regarded as negligible. It is in dealing with these types that we feel the greatest need for clinical coöperation, because clinical diphtheria may, in exceptional instances be caused by these bacilli, although in the majority of cases the D_2 type is a negligible organism. (4) Regard E_1, E_2, F, G, F_1 and F_2 as negligible. (5) Test the virulence of all cultures of solid types of bacilli after the patient has recovered and is being quarantined over a long period of time by positive cultures. These inoculation tests are especially indicated with cultures from the nose or ear. If the above method is employed by the bacteriologist and if three successive negative cultures are required instead of two before quarantine is lifted, combined with the judicious use of the animal inoculation test in suitable cases, we feel that the bacteriologic diagnosis and management of diphtheria will be efficient and satisfactory to all.

Dr. White said that he agreed with most of what Dr. Kolmer had stated as the greater part had been in actual operation for the past eighteen months in the City Hall Laboratory. He reincubates when either the short forms of the bacillus are found, calling it positive when granular or barred bacilli are present. If, at the end of reincubation beaded or banded types are present, the culture is positive; if otherwise, negative. For the morphologic diagnosis of diphtheria bacilli in cultures, the time of incubation, the reaction of the culture media and the method of making swabs are all very important. The sugar tests for the differentiation of true from pseudodiphtheria bacilli are not practical in a Board of Health laboratory. The routine use of the guinea-pig test for testing virulence is also not practical from a Board of Health laboratory, as diagnosis and release of quarantine must be accomplished within twenty-four hours. The responsibility of long quarantines could be taken care of better if the attending physician obtained the first negative culture and the Board of Health official the second negative culture. Dr. White asked Dr. Kolmer whether he considered mutating organisms a source of danger to the public health.

DR. ALICE WELD TALLANT spoke of the need of distinguishing between virulent and non-virulent organisms as exemplified in a supposed diphtheria epidemic in an institution for girls. Positive cultures were found in 5 successive cases of sore throat among the officers, in spite of rigid quarantine, and the immunization of all contacts. Cultures were taken from 68 healthy persons in the hope of discovering a carrier, and when 22 of these proved positive, tests upon guinea-pigs were made at the State Laboratory, which showed that neither these organisms nor those in the fifth case were virulent.

DR. KOLMER said that if an organism can be proved to be the pseudodiphtheria bacillus, the case from which it came should not be considered dangerous, while he does not believe it possible to differentiate between virulent and non-virulent bacilli by morphology alone, yet experience with a morphologic classification frequently checked up by animal inoculation tests offers the best solution for the problem of practical work where a diagnosis is necessary in twenty-four hours. It is necessary that cultures be incubated properly and for a sufficient time, and he prefers requiring a second culture to reincubating the primary cultures.

THE WETNURSING OF FOUNDLINGS.

DR. W. ESTELL LEE read this paper, illustrating it with lantern slides showing the babies before being sent to the wet nurses and afterward. Dr. Lee detailed an attempt made by the Children's Aid Society to lower the mortality among its homeless children by organizing a bureau and directory of wet nurses to care for the ward of the Society and to supply physicians with suitable wet nurses when needed. The plan was successful and the cost not high. (The paper will appear in a later ARCHIVES.)

DR. A. H. DAVIDSON asked whether the wet nurses also nursed their own babies. He added that Italian women had been found very good mothers for the St. Vincent Home babies. Had Dr. Lee found that nursing two babies increased the amount of breast milk secreted?

DR. C. H. LEFCOE expressed his gratitude to the Children's Aid Society and to Dr. Lee for having established such a low price for this most necessary addition to our warfare against infantile mortality, the wet nursing of infants.

DR. W. D. ROBINSON said that, in his work as a member of the Child Hygiene Committee, he had observed several of these St. Vincent Home babies boarded out among the Italians and had found them doing well in spite of unsanitary surroundings and the quantity of other children in the families into which they had been received.

Dr. Tallant referred to a case in the out-patient department of the Woman's College Maternity, in which a woman who had given birth to a macerated syphilitic fetus dismissed the hospital physicians on their refusing to sanction her going as a wet nurse and presumably she secured the desired position anyway.

Dr. D. J. Milton Miller asked whether the Children's Aid Society extends any aid to the very poor mothers who are nursing their infants. He spoke of a recent report of work done in Birmingham, England, where one good meal was given these women daily; this increased the fat content of the breast milk, and their babies thrived, increasing in weight. The mothers' health also improved. When the meals were omitted, the percentage of fat fell with a corresponding fall in the infants' weight. Such work would help to reduce the infantile mortality here. In the Birmingham report many milk analyses were made and some interesting facts brought out as to fats. The fats were high when the average quantity of milk was small and also when the intervals between nursings was short. But they did not increase as the child grew. The fat was the only constituent of the milk influenced by the food of the mother.

Dr. Lee added that only two of these infants were nursed by a mother who was not also nursing her own baby at the same time. Mothers who nurse two babies always have an abundant supply of breast milk. Italian women refused to take sick babies to nurse, though they gladly took well infants. The Children's Aid Society helps nursing mothers by getting them employment, where they may keep their babies with them. Though the mother has to work hard, food is provided and thus she can nurse her baby. The city nurses have the power to supply milk to needy nursing mothers. In 38 cases women who applied to become wet nurses refused to allow their blood to be examined; they were all refused. Wassermann reactions were positive in 3 mothers and in 3 infants, among a total of 75 mothers and babies examined.

The President then delivered the Annual Address.

CURRENT LITERATURE.

Abstracts in this Number by

Dr. T. Wood Clarke.
Dr. Charles E. Farr.
Dr. S. Feldstein.
Dr. Alfred F. Hess.
Dr. J. S. Leopold.
Dr. William A. Murphy.
Dr. Samuel W. Thurber.
Dr. J. Herbert Young.

DISEASES OF THE EAR, NOSE AND THROAT.

Yearsley, Macleod: The Prevention of Deafmutism. (*Annals of Otology, Rhinology and Laryngology,* September, 1912, p. 585.)

The plea is made that all otologists should turn their attention to the study of deafmutism. The movement for its prevention should be international. The general practitioner generally see the potential deaf-mute first and upon him rests the responsibility of prompt treatment and advice. Every deaf-mute school contains scholars who are the victims of lost opportunity.

The author personally has analyzed 1,076 cases, of which 45 per cent. were born deaf and 55 per cent. acquired deafness. Of those born deaf, three groups could be arranged: (1) Those in whom no family history was obtainable; (2) those in whom family history contained no evidence of other deaf births; (3) those in which there was a family history of congenital deafness. These really may be taken to show that there are cases of true hereditary deafness or sporadic congenital deafness. Some of the second class may have acquired deafness in very early infancy, as deafness is often not detected until the second year. Of the congenital deaf, 145 cases in 123 families, 24 per cent. show deafness in direct line of parentage; 31 per cent. showed it in collateral lines; the collateral family lines are equally, if not more, important than the direct. Out of 309 families where there were cases of congenital deafness, cousins married in 7 per cent., and in 592 families where there were cases of acquired deafness cousins married in but $^3/_{10}$ per cent. In one school where there was a large proportion of Jewish children, out of 137 families consanguinity occurred in 27 per cent; so that combining the two percentages in the 446 families where deafmutism occurred there were 59 consanguineous marriages (the normal proportion in Great Britain of cousins marrying is about 1 in 65).

Alcohol and insanity play a very important part in congenital deafness. Syphilis affected more the sporadic cases according to the author's opinion.

Of the 592 acquired cases, 34 per cent. were due to the infective diseases, 26 per cent. of these belonging to the exanthemata in the following order: Measles, 11.5 per cent.; scarlatina, 9.7 per cent.; diphtheria, 2 per cent.; influenza, $^{67}/_{100}$ per cent.; pertussis, 1.18 per cent.; German measles, 0.33 per cent.; enteric fever, 0.33 per cent.; cerebrospinal meningitis, 0.16 per cent., as also varicella and mumps. Of other diseases, pneumonia was responsible for 2.7 per cent., tuberculosis 0.33 per cent., syphilis 6.5 per cent.; diseases of the nervous system took their toll of 18.7 per cent., and middle ear suppuration and catarrh 20.7 per cent. Of the cases due to injury, 58 of the acquired cases fell in this division.

The author looks forward to laws prohibiting marriages of deaf-mutes, blood relations, alcoholics and syphilitics; better care of children generally; more careful examination of the ears in all fevers; the recognition of the evil effects of adenoids and nasal diseases and the better teaching of otology in the medical schools.

S. W. THURBER.

SURGERY.

FLODERUS, B.: PRIMARY TUBERCULOSIS OF MESENTERIC LYMPH NODES FROM SURGICAL STANDPOINT. (*Nordiskt Med. Arkiv,* Stockholm.)

Primary tuberculosis of the mesenteric lymph nodes is a fairly common condition, but the diagnosis is difficult to arrive at, cases usually being mistaken for tumor, appendicitis, intussusception, etc. The cases are usually seen in young children and are due to infection from cow's milk or butter, or tuberculous sputum in about equal proportions. Acute infection in the corresponding part of the intestine seems to favor the process. Pain in the region of the navel or cecum is the first symptom, accompanied frequently by vomiting, diarrhea and mucous stools. Fever is the rule and is usually high if suppuration is present. Miliary tuberculosis frequently results, but the disease does not ordinarily spread to the other organs. The nodes can usually be felt by abdominal or rectal examination and the tumor may be of very large size, while tenderness is not always present. The X-rays may aid in the diagnosis. Only 50 operative cases are on record, to which the author adds 12. The mass should be enucleated close to the capsule and the rest in the mesentery closed with catgut sutures. In 12 of the cases a segment of the intestine had to be removed. No drainage is used. Nine of the cases died of hemorrhage, peritonitis, sepsis or miliary tuberculosis, and in 3 of these cases the operation may have caused the fatal outcome. The results of operation, as a rule, are good, recurrence is exceptional. All swollen nodes should be removed if possible, but if the pus pockets are large, a less radical procedure is indicated. The operation should be performed promptly in all cases having active symptoms even although a moderate degree of pulmonary tuberculosis exists. The nodes usually affected are those in the ileocecal region. CHARLES E. FARR.

DESMAREST, E.: SUTURE OF TRAUMATIC SEPARATION OF THE LOWER EPIPHYSIS OF THE FEMUR. (*Rev. de Chirurg.*, Paris. October, 1912.)

Desmarest reports 1 personal case of this rare injury and finds 6 similar cases in the literature, in which the fragments were approximated by open operation and held by plates or screws. The results in all were very good, with the exception of 1 case, which developed scarlet fever and died before the wound healed. The operation consists in opening the fracture region widely, replacing the fragments in position and applying a plate and screws. No drain is used and the part is encased in plaster. The authors case was in a boy of eleven and the functional result was excellent. He used an aluminum plate and six screws. There was a moderate reaction but no pain.

CHARLES E. FARR.

ASHURST, ASTLEY P. C.: TREATMENT OF DISLOCATION OF THE HEAD OF THE RADIUS COMPLICATED BY FRACTURE OF THE ULNA. (*Annals of Surgery*, October, 1912.)

Ashurst reports from the literature 5 operations in recent cases and 27 in old unreduced cases of luxation of the head of the radius complicated by fracture of the ulna. Of the old cases, in 14 the ulna united in fairly good position in 5 in which attempts at reduction were made; luxation recurred in 2. In 9 the head of the radius was excised. The result was good in each.

Six cases of mal-union of the ulna; 2 treated by osteoclasis of ulna and reduction of radius with one good result and one unknown result; 1 treated by osteotomy of ulna and open reduction of radius with recurrence; 1 by osteotomy and excision of head of radius with excellent result; 1 treated by excision of elbow joint with good result, and 1 treated by excision of radius with poor result. There were 7 cases in which the ulna was ununited; 3 were treated by operation on the ulna alone and were improved; four were treated by operation on ulna and excision of head of radius, of which 1 was cured, 2 were improved and 1 gave a bad result.

The author's personal case was a boy of eleven who fractured the left ulna at the junction of the upper and middle thirds accompanied by an anterior luxation of the radius. He was first seen by the author after three weeks, when the fracture was united, but the dislocation could not be reduced. At the end of four months he was operated upon and the head of the radius was replaced by raising and incising the orbicular ligament, which was carefully sutured in place after the reduction. Improvement was slow and not complete at present, but the result is nearly perfect. He concludes that in recent cases the vital indication is the reduction of the dislocation; in old cases, with the ulna united, arthrotomy is indicated for reduction of the dislocation. If this is impossible excise the head of the radius. Osteotomy of the ulna should be done only in cases of extreme deformity. If there is non-union of the ulna the fragments should be freed and the dislocation then reduced if possible, doing an arthrotomy if necessary CHARLES E. FARR.

FÖRSTER, C.: TUBERCULIN TREATMENT OF SURGICAL TUBERCULOSIS IN CHILDREN. (*Beitr. zur Klin. der Tuberku.*, Würzburg.)

Förster reports the tuberculin treatment in 21 cases of tubercular bones and joints in children. Very small dosage was used, beginning with one-half, or one millionth of the milligram, as these children are particularly susceptible to tuberculin. The focal reaction and the puncture-hole reaction should be mild and the general reaction very slight. The dose is not increased until the local reaction ceases after injection. If the reaction is too severe the dose is reduced one-half and is not given until all signs of reaction are gone. Increase in dosage is made very gradually watching carefully the reaction from each dose. The best results were invariably in those cases in which the von Pirquet reaction was the sharpest. Of the 21 cases reported, 3 were not benefited, while marked improvement was shown in all the others. The routine treatment of surgical tuberculosis—rest, fresh air and food—was used in all the cases. CHARLES E. FARR.

ABELS, H.: FOREIGN BODIES IN BLADDER OF GIRL INFANTS. (UEBER HARNBLASENERKRANKUNGEN BEI KLEINEN MÄDCHEN DURCH BISHER NICHT BEOBACHTETE FREMDKORPER.) (*Wien. klin. Woch.*, Vienna, November, 1912.)

Foreign bodies of all kinds have been found in the bladder, but Abels reports 2 cases which are quite unique. Both were little girls, one nine years of age, the other seventeen months, and in each a piece of paper wound around with a hair was found to be the cause of the severe cystitis. Evidently the paper had been rolled and wound with a hair and introduced into the bladder as a catheter by another person. In a somewhat similar case reported by Blum, in a girl of four, threads from the child's clothing were found in the bladder, and it was learned that she had a habit of pressing her clothes against the urethra to control micturition.

CHARLES E. FARR.

BRANDENBERG, F.: EPIGASTRIC HERNIA IN CHILDREN. (*Archiv. für Kinderhk.*, Vol. LVIII., p. 8.)

Contrary to the opinion expressed in the text-books, this is not a rare condition in childhood. The most striking symptom is pain after meals, more especally after breakfast. It is usually relieved by pressure on abdomen. The pain usually lasts only a few minutes. Palpation shows a small tumor just beneath the skin, which disappears under pressure without a gurgling sensation. In the absence of a tumor a sharp edged square ring is felt in the linea alba. Usually it is found in the median line, above the umbilicus, occasionally to one side of the umbilicus. The exciting causes are obesity and increase in abdominal pressure during crying or severe coughing spell. Preperitoneal fat may simulate a hernia. The hernial sac contains free or adherent omentum, at times the sac is empty. Radical operation is rarely indicated. In the cases of true epigastric hernia, situated more than 1 cm.

above the umbilicus, the use of a rubber pad held in place by adhesive plaster is satisfactory. Applied for a considerable time it produces complete disappearance of the subjective symptoms. In the paraumbilical hernia, in which the ring is more than ½ cm. long, this mode of treatment is rarely satisfactory, especially in children above one year of age. These cases require surgical treatment. If preperitoneal fat alone is present, its removal is all that is necessary. But if a sac is present it should be opened, and if the omentum is adherent it should be resected. The sac should be sutured with very fine needle and silk. While paraffin injection usually relieves the symptoms promptly, the end results are not satisfactory. Recurrences with this mode of treatment have been seen frequently. The results of the radical operation are more satisfactory in children than in adults.

S. FELDSTEIN.

MEDICINE.

SSOKOLOW, D. M.: ADENOPATHY IN CHILDREN. (*Archiv. für Kinderhk.*, Vol. LVIII., p. 103.)

This exhaustive paper, with eighty-eight references to the literature, deals with the anatomy, physiology, bacteriology, pathology and clinical aspects of the diseases of the glandular system. Three instructive cases of infection with streptococcus, influenza bacillus and bacillus coli are cited. Persistent irregular temperature was present in all. Adenopathy is one of the most common diseases of childhood. The peripheral nodes are most vulnerable, especially the submaxillary and cervical nodes. The mediastinal and trachobronchial nodes come next in frequency, while the mesenteric nodes suffer less often. The affection may run an acute, subacute, or chronic course, and is due to the presence of various bacterial and non-bacterial irritants. The tubercle bacillus is most often present, but the streptococcus, staphylococcus, pneumococcus, influenza bacillus, bacillus of pertussis, bacterium coli and typhoid bacillus have also been demonstrated. These may be present in a latent state. The diagnosis of disease of the peripheral nodes is not especially difficult. That of the nodes in the body cavities is more difficult, as at times only the presence of fever reveals its existence. The disease may run an acute course with considerable temperature, or a milder, but much more prolonged, course. The treatment must be conservative. Inunctions, massage and other procedures intended to hasten absorption should be avoided. Extirpation is not recommended. Incision is advised only after suppuration is well established. Hot compresses, cataplasms and light therapy are useful in the treatment of the accessible nodes. In affections of the tracheal nodes an absolutely pure dust-free cold climate is necessary. In diseases of the mesenteric nodes a non-irritant, non-fermentable, and sterile diet is advised. S. FELDSTEIN.

CAUTLEY, EDMUND: MUCOUS GASTRITIS IN INFANCY. (*British Journal of Children's Diseases,* June, 1912.)

This is more common in infants before the fourth month. The prognosis is good with careful treatment, but guarded in marasmic or premature children. Pathologically speaking, it is a catarrh of the gastric mucosa. Its causes are high fat feeding, preservatives in milk and infective agencies, with malnutrition and prematurity as predisposing factors. While it occurs in older children, its frequency and ill-effects are not so pronounced.

Treatment.—Lavage may be of service, but is often unsatisfactory; bismuth is occasionally of assistance, alcohol being contraindicated; proper feeding is the most efficient. For cow's milk the author usually substitutes sweet whey powder, malted milk or Allenbury No. I., after several days beginning to add small amounts of fresh cream, which is gradually increased to normal.

Inasmuch as there is often a question of diagnosis from other forms of gastric disturbance in children, the author's classification of wasting diseases of children is interesting: (1) Atrophic dyspepsia, ending in marasmus; (2) acid dyspepsia; (3) pyloric spasm; (4) mucous gastritis; (5) hypertrophy of pylorus.

WM. A. MURPHY.

MALLORY, F. B., AND HOMER, A. A.: PERTUSSIS: THE HISTOLOGICAL LESION IN THE RESPIRATORY TRACT. (*Journal of Medical Research,* November, 1912, p. 115.)

The authors come to the following interesting conclusions as the result of their experimental work:—

"Whooping cough is due to a minute bacillus which occurs in large numbers between the cilia of the epithelial cells lining the trachea and bronchi and possibly also the nose. The location of the organism is apparently characteristic for the disease. Its action seems to be largely mechanical. It interferes by its presence with the normal movements of the cilia and possibly leads to their destruction.

"The mechanical interference with the action of the cilia, and possibly their destruction, prevent the normal removal of secretion. The bacilli and the secretion produce a continuous irritation which results in coughing and usually also in the characteristic spasm known as whooping.

"The bacillus found in the lesions is probably identical with the organism discovered and described by Bordet and Gengou, but this identity remains to be demonstrated by the experimental production of the characteristic lesion in monkeys and puppies."

ALFRED F. HESS.

FRIBERGER, R.: ARRHYTHMIA IN HEALTHY CHILDREN. (*Archiv. für Kinderhk.*, Vol. LVIII., p. 30.)

The author examined 321 children from five to fourteen years of age. Sixty-four were reëxamined and did not show noticeable change from the previous examination. A Jacquet polysphygmograph was employed. The pulse curve was taken for one minute, simultaneously with the respiration curve and the venous pulse at the bulb of the jugular. The previous history of the children was thoroughly investigated. The examination included the body weight and length, the blood pressure, the urine for albumin, the character of the nutrition, the muscular development, the heart action before and after running for one minute, the presence of dyspnea and the condition of the lungs.

A perfectly regular pulse was present in none of the children. Differences of 0.2 to 0.3 second in the pulse were present in 64.9 per cent.; of 0.1 second in 12.7 per cent.; of 0.4 to 0.5 second in 18.9 per cent.; of 0.6 to 0.7 second in 3.4 per cent.

The author divides the children into three groups:—

(1) Cases with slight arrhythmia in which the greatest difference was not more than 50 per cent. of the shortest individual curve, 37.4 per cent.

(2) Cases with moderate arrhythmia in which the greatest difference was less than double the shortest curve, 50.4 per cent.

(3) Cases of still more marked arrhythmia, 12.2 per cent.

In most of the cases the pulse beats progressively increased for a number of beats, and then decreased. Another type showed sudden retardation at regular intervals, followed by gradual increase in rapidity. Others small irregular difference. Others still showed alternately short and long beats. The arrhythmia in children seemed to arise at the sinus. Auricular extrasystole was seen, but real ventricular extrasystole and auriculo-ventricular heart-block were not observed in the children. Respiratory arrhythmia was present at one time or another in all the children. The longest pulse beats were present at the end of expiration, the shortest at the end of inspiration. Differences in amplitude of the pulse were also demonstrable, but were not as marked as the time differences. The most marked irregularity was present in very rapid or very slow cardiac action. From five to twelve years of age the frequency of moderate and marked arhythmia progressively diminished. During the ages of thirteen and fourteen the arrhythmia became more frequent. It was somewhat more frequent in girls, 69.8 per cent.: 59 per cent. The size, weight and muscular development did not seem to influence the frequency of the cardiac irregularity. Cardiac insufficiency was also not a factor of importance. Neuropathic constitution played only a slight rôle. Pulmonary tuberculosis, pronounced or suspected, did not show a larger proportion of irregular pulses. Arrhythmia was, however, somewhat more frequent in the anemic children. S. FELDSTEIN.

NIETNER, PROFESSOR: THE MODERN COMBAT AGAINST TUBERCULOSIS AMONGST CHILDREN. (*Medical Press and Circular,* November 6, 1912, p. 488.)

The German Central Committee for the Prevention of Tuberculosis was formed in 1895 to link up all schemes and institutions throughout Germany, whose purpose is the prevention of tuberculosis. The president is the State Secretary of the Interior. The State gives a yearly grant of $15,000. The early work was directed to the cure of early cases; later it was directed more toward prophylaxis. While the incidence of tuberculosis among adults is decreasing in Germany, there is no decrease among children. In a very large majority of cases of tuberculosis the infection has taken place during the first years of life. Ninety per cent. of all children are infected before twelve years old. It is a true child's disease, acquired during childhood, and must be prevented in childhood. The point of danger is in the home with contact with "open tuberculosis." Schools cannot be held responsible for the spread of the disease. To the school doctor, however, belongs to a large degree the power of preventing the latent cases developing into active disease. With a complete State organization of school medical supervision the recovery would be possible of large numbers of children who otherwise would progress in the disease. Tuberculin, properly administered, is of great value in the treatment of tuberculosis in children.

T. WOOD CLARKE.

ZARFL, MAX: ON THE PRIMARY FOCUS IN TUBERCULOSIS OF THE LUNG. (*Zeits. für Kinderhk.,* November 16, 1912, p. 303.)

It has been known for a long time that the pulmonary glands are almost always the seat of involvement in tuberculosis in children. It was at first thought that the tubercle bacilli entered these glands by means of the blood stream. But Parrot, Küss, E. Albrecht and H. Albrecht and, finally, Ghen, have known that the lung is always involved, often to a very slight degree, and from the pulmonary involvement the glands become infected. All these observers have shown that the tuberculous focus in the lung in nearly every case is of longer standing than the tuberculosis of the corresponding glands. These observers have come to the conclusion that tuberculosis in infants is almost always aerogenous in type; that is to say, infection has taken place by means of aspiration through the lungs.

Zarfl reports the case of an infant that had died at twenty-nine days of age. It was born of a tuberculous mother, who had died one week after child birth. The infant was no doubt infected by its mother after birth. The infant died with a clinical diagnosis of pneumonia. On autopsy a small tuberculous spot was found in the lung without any glandular involvement. It is interesting to note that at nine days of age the Pirquet reaction was negative. This case is very interesting as supporting the theory of Parrot, Küss, the Albrechts and Ghen that pulmonary involvement takes place before the glands are involved. A very thorough search was made, but no glands were found involved. According to Zarfl there is only one other case on record (Ghen) which shows a similar condition. This case clearly proves that the primary focus of tuberculosis is in the lung and not in the regionary lymph glands.

JEROME S. LEOPOLD.

FLEXNER, SIMON: SOME PROBLEMS IN INFECTIONS AND ITS CONTROL. (Huxley Lectures at Charing Cross Hospital, printed *in Science,* November 22, 1912.)

Dr. Flexner reviews the work on poliomyelitis from the Scandinavian epidemic when it was first recognized as infectious to the more recent investigations when its transmissibility to monkeys by intraperitoneal inoculation was demonstrated. The causative organism, he concludes, is a parasite, ultra-microscopic and filterable, since the most varied methods of staining and culture has not identified it and an emulsion of the cord of a paralyzed animal is capable of reproducing it even when passed through a Berkefeld filter. The activity of the filtrate is so great that a fraction of a cubic centimeter will cause paralysis in a monkey.

The first filterable parasite discovered was that of foot and mouth disease. Eighteen diseases are believed to be caused by this class of living organisms, three of which affect human beings—yellow fever, dengue and poliomyelitis. The ultra-microscopic viruses employ no single means of affecting entrance into the body. Some, as yellow fever, utilize insects and others gain entrance through skin wounds; some are swallowed and others inhaled.

As applied to poliomyelitis, the virus stands midway in point of size between finest and the coarsest—is highly resistent to drying and to light as well as chemical action. In dust it survives weeks, and even months; in diffuse daylight indefinitely and resists action if pure glycerin and carbolic acid in .5 solution for many months.

The immunity acquired by an attack can be reinforced by subsequent infections of large quantities of the living virus. Active immunity in monkeys can be acquired by first injecting minute and later large amounts of the virus.

As to its modes of infection, analogy with other diseases produced by filterable viruses excludes no one of the possible modes of entrance. It attacks chiefly the central nervous system and has been detected in spinal cord and brain, mesenteric lymph, also in mucous membranes of nose and throat and its secretions; in the mucous secretions of the stomach, small and large intestines. It has been detected in the spleen, liver, kidneys and bone-marrow.

From the evidence at hand it appears that different strains of poliomyelitis exist, the Swedish of 1911 being the most virulent yet studied.

The employment for treatment of the immune serum taken from monkeys or human beings exercises a certain definite, if not very strong, protective action upon the inoculated monkeys. The disease is prevented altogether or it is diminished in severity; it acts best when injected into the subdural space on several successive days.

As to specific chemical therapeutics, hexamethylamine has some effect when administered at the time of inoculation of the virus. WM. A. MURPHY.

THERAPEUTICS.

LEURIAUX C.: THE TREATMENT OF A SEVERE CASE OF CHOREA WITH "606." (*La Path. Infant.*, November, 1912, p. 205.)

Leuriaux reports a very severe case of chorea in a girl eleven years of age that had resisted all other methods of treatment and was finally cured by salvarsan. At the first injection 20 cg. were given in 150 grams of distilled water; the second injection was given eight days later and consisted of 20 cg., and the third and last injection was given ten days later of 30 cg. The cure was a permanent one. JEROME S. LEOPOLD.

WHITFIELD, ARTHUR, M.D.: A METHOD OF RAPIDLY EXTERMINATING PEDICULI CAPITIS. (*The Lancet*, December 14, 1912, p. 1,648.)

The method described has been used by the author for twelve years past and is as follows:—

The patient is laid on her back on the bed with the head over the edge, and beneath the head is placed a basin on a chair, so that the hair lies in the basin. A solution of 1 to 40 carbolic acid is then poured over the hair into the basin and sluiced backward and forward until all the hair is thoroughly soaked with it, especial pains being taken as to the nape of the neck and the scalp above the ears. At the end of ten minutes by the clock the hair is lifted from the basin and left to drain a short time, after which the whole head is swathed turban-wise in a thick towel or a large piece of common house flannel and left for an hour. The hair may now be washed, or simply dried, for at the end of this period every pediculus is dead and also every ovum, as they will not hatch if left on the hair. Relapse will not occur except through fresh exposure, and unless there be some complicating impetigo no further treatment will be necessary.

The author considers the method perfectly safe for all children of five years or older, and says that if this were made the routine treatment of "dirty heads" in the schools he thinks the frequency of the disease would be greatly diminished.

WILLIAM LYON.

FINKELSTEIN, H.: THE DIETETIC TREATMENT OF ECZEMA IN INFANTS AND CHILDREN. (*Kassowitz's Festschrift,* 1912, p. 60.)

Finkelstein calls attention to the fact that eczema is a disturbance in metabolism. Some cases do well if they are made to lose weight, while other cases only do well if they gain weight. Some cases are cured of their eczema if placed on a diet rich in salts, with a consequent gain in weight. Other cases only lose their eczema when they are undernourished.

Each case should be treated as an individual and should be put on that diet which corrects the disturbance in metabolism.

JEROME S. LEOPOLD.

WEILL, MOREL, AND MOURIQUAND, G.: RECTAL ABSORPTION OF SALVARSAN IN CHILDREN. (*La Ped. Prat.,* September 15, 1912, p. 464.)

The authors conclude that salvarsan is easily absorbed by the rectal mucosa of children; that this absorption causes distinct improvement in certain cases of hereditary syphilis and in severe chorea; and that rectal administration is the method of choice in children since it is sufficiently active without causing local or general reaction. The drug is prepared according to the method of Ehrlich for intravenous injection. The total amount given is

100 c.c. The first dose is 10 cm., the second 20 cm., and the third 40 cm. Five to ten drops or laudanum are added to each injection. The injection should be extended over as long a time as possible, four hours at least. J. HERBERT YOUNG.

INFANT FEEDING.

STOLTE, KARL: HIGH FATS IN INFANT FEEDING. (*Münch. Med. Woch.,* December 17, 1912, p. 2,804.)

Stolte, writing from Czerny's clinic in Strassburg, makes a plea for higher percentages of fats in infant feeding. If too high a percentage of sugar is used, although there may be a good gain in weight, still the weight curve falls very quickly if the infant has even a very mild infection. Infants that have been fed on large amounts of sugar very frequently have evidences of fermentation. Meteorismus is also a very common condition in this class of cases.

An infant will not gain in weight if large amounts of proteid are given without sufficient sugar, for example, on eiweissmilch.

It is true that high percentages of fats may cause a dormant "exudate diathesis" to light up, but in normal infants very large amounts of fat may be given with very good results. Stolte gives 5, 6, 7 and even higher percentages of fats to his infants with very good results. If the stools show the presence of fatty soaps milk sugar is added. JEROME S. LEOPOLD.

CALVARY, MARTIN: SUGARS IN INFANT FEEDING. (*Ergebn. der Inner. Med. und Kinderhk.,* 1913, Vol. X., p. 699.)

Calvary has written a very thorough monograph on the various sugars in infant feeding. An immense bibliography is added which contains practically all references to sugars in modern times. The article should be read in the original by all who have to do with the feeding of infants.

Calvary states that although the last word has not yet been said on sugars in infant feeding, still numerous metabolism experiments and clinical observations have taught us many new and rational views on infant feeding. We must add enough sugar to the infant's food or it will not gain enough in weight; at the same time, if we add too much sugar severe intestinal disturbances may follow. Three to five per cent. of sugar is, in most cases, enough to add to the infant's food. In well infants cane sugar is the sugar of choice, not only on account of its cheapness, but also because in well infants it is assimilated as well as any other sugar.

The dextrin-maltose preparations are by far the best for infants whose stools have a tendency to become loose; the dextrin-maltose preparations are also indicated during convalescence from gastroenteritis. Milk sugar is the sugar of choice if the bowels have a tendency to become constipated. JEROME S. LEOPOLD.

MORSE, J. LOVETT: MALTOSE IN INFANT FEEDING. (*American Journal of Medical Science*, November, 1912.)

Lactose favors the development of bacillus bifidus normally predominant in the large intestine. Maltose favors bacillus acidophilus, which, if present in large numbers, causes an excessive acidity and irritation of the intestines. Under normal conditions, as regards the intestinal flora, lactose is preferable. In spite of the fact that the assimilative limit of lactose is lower, if equal parts of lactose and maltose are given, more of the latter is excreted in the feces. Again, maltose forms a readier medium for development of organisms foreign to the intestinal tract normally.

Since in the presence of both carbohydrates and proteid substances bacteria produce from the first preventative products and the other putrefactive, it is important to have an excess of readily fermentable carbohydrate present. Lactose, being more slowly broken down, would seem the preferable since it exerts a more prolonged influence.

There is a variety of intestinal indigestion which is relieved by reducing sugar and salts to a minimum and giving large amounts of casein in which the dextrin-maltose preparations can be given earlier than lactose. This type, either acute or chronic, is characterized by an increased number of stools of diminished consistency green in color, often frothy, acid in reaction and containing often mucus and fat in stools. This is to be distinguished from the type resembling it, associated with the presence of the group of bacilli, in which are bacillus perfringens and gas bacillus. Maltose is more harmful in this condition than lactose. WM. A. MURPHY.

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EDITORIAL.

MEDICAL INSPECTION OF PRIVATE SCHOOLS.

Many thousands of dollars are yearly paid out by our cities for the medical inspection of the children in the public schools. From the smallest beginnings, in New York at least, the work has grown in amount and in scope until we can feel that there is little danger of widespread and uncontrolled epidemics of the contagious diseases, and that in so far as is reasonably possible the children in the public schools, whose parents may have neither the knowledge to detect nor the means to remedy defects existing in their children, are straightened out and given a chance to be healthy and to grow properly. The Department of Health is continuously and unremittingly extending its efforts along these lines, and many an outbreak of measles or diphtheria or scarlatina has been detected in its incipiency and crushed out because someone was there on the picket line to notice the first advance of the enemy. The teachers, too, in our public schools have become accustomed to recognize symptoms both of disease and of defects and oftentimes it is they who quarantine some suspected child before the arrival of the inspector assigned to that school. So that contagion, physical defects such as spinal curvature, chronic endocarditis, adenoids, enlarged tonsils, decayed teeth, etc., are recognized and remedied to a large extent among the poorer classes.

How is it with the private schools? Do they have medical officers, and do they watch for contagious diseases, or point out to well-to-do, but not too careful, parents the mouth-breathing or the crooked backs of their children? Some of them do have such officers, and the work of these men is often of the highest character, but many schools do not have the slightest protection in this regard. They seem to feel that it is not necessary for children of the well-to-do. In speaking to the head master of one of our largest private schools, it came out, in reply to a question whether he did not consider a school physician necessary, that inasmuch as his scholars came from the upper classes of society they did not need regular medical inspection. And yet all of us can recall that private schools are closed each winter because of school epidemics, and that at the present writing there is an epidemic of German measles among the private schools, as there was one of grippe-like colds earlier in the winter. Some parents say, with blind confidence, "We have no more fear that Walter will get the measles now that he has left public school and entered private school," and frequently, to their surprise and infinite disgust, their beloved Walter comes home with some contagious disease which he has contracted at the paid-for school and loses a larger or smaller part of his costly tuition.

Such inspection should be a part of the regular routine of all schools, and the inspection should extend to fitness for gymnasium work and the hard, active play at recess. Many boys and girls are losing in weight and looking dragged out because they have to do too much, or are playing with comrades who are too big for their strength. Children never say "die" and it is only too common to see a thin, nervous boy with dark circles under his eyes hurrying through his meals or eating next to nothing, sleeping poorly, and giving a hemoglobin reading of fifty or sixty, who will do well when restrained, as might so nicely be done if his private school had the proper facilities for medical supervision.

It is a great satisfaction for a parent to know that his child is in the hands of a principal who deems the health of the child of paramount importance and who regulates his institution so that *mens sana in corpore sano* becomes a fact there and not a pleasant fiction. T. W. Kilmer.

Dr. Leonard Guthrie's essay in *Pediatrics* for June, 1912, anent the teething disorders of children, is quite delightful. His notion is that teething is a physiologic process, and that the ordinary phenomena of painful dentition are dependent on alimentary disturbance associated with a "common cold," dentition becoming painful when the gums become "unhealthy." For the rest, he thinks it were strange if teething did not often coincide with major illnesses; so that the happy improvement that often ensues when the gums of a convulsed baby are lanced is due to the lucky coincidence of the crisis of an apical pneumonia that has been diagnosed as "meningitis," and has been the cause of the convulsions.

It is the experience of all family doctors that some children always cut their teeth in certain ways. That is to say, some children always, or generally, have bronchorrea when teething, the bronchorrhea disappearing with the eruption of the tooth. Others have diarrhea; others again have fits, or otorrhea, or skin eruptions. Many children certainly cut their teeth with little or no disturbance; but when a doctor sees, not once but even seven times, three or four members of a family each cut teeth with certain symptoms that disappear as soon as the tooth is through, he thinks that something more than the long arm of coincidence is at work, even if he cannot explain what and how. The theory of reflex irritation may perhaps give way to a better or fuller explanation. But we cling to our belief that teething may set up symptoms that closely resemble those of disorders that arise independently of dentition, and that a little judicious gum-lancing may decide the diagnosis in favor of meningism instead of meningitis and save hours of anxiety.

It seems so difficult for medical men to get away from their trick of denying what they cannot explain satisfactorily. If a mother ascribes her child's illness to teething, she does not mean that no other causes can possibly be at work as well. She means that, if the child had not been teething it would not have suffered such an illness, and she is probably right. Causation in the realm of medicine is not such a simple affair as many seem to think.—*Universal Medical Record, September, 1912.*

ORIGINAL COMMUNICATIONS.

SOME PRACTICAL POINTS IN THE MANAGEMENT OF BREAST-FEEDING.

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In this article I propose to give a few practical hints on the management of breast-feeding which I hope may be useful to those who have medical charge of young infants. There is a popular tradition that there is little to learn about breast-feeding, that there is, in fact, some sort of physiological co-aptation between the secretory functions of the breast and the nutritional requirements of the infant which reduces our responsibility and the mother's responsibility to that of putting the infant to the breast every two hours and leaving it there until in the exercise of its unfettered will it refuses to take any more nourishment.

There never was a greater mistake. After many years' study of the practical details of both methods of feeding—the natural and the artificial—I have come to the very definite opinion that, provided the physician has mastered the essential principles of artificial feeding, of the two methods artificial feeding is the easier to manage. In saying this I hope my words will not be construed as implying that the easier is the better method.

If one tithe of the human ingenuity which has been lavished of recent years on improvements in the artificial method had been bestowed on the study of the problems of breast-feeding I firmly believe that half the children who are now relegated to the bottle would remain at their mother's breasts, and that half the tragedies of mismanagement would be obviated. It appears to be nobody's business to make a study of breast-feeding, or to teach its principles. The obstetric physician thinks it beneath his dignity to study such a commonplace matter as the feeding of the infant, and leaves the details to the nurse. Moreover, both he and the latter pass on to fresh cases and "pastures new" without having opportunities of studying the after-effects of their treatment—or neglect. And these are the individuals from whom flow the common streams of knowledge concerning the early management of infants. On the other hand, the children's specialist has few opportunities of supervising the management of breast-feeding until the damage has been inflicted and the infant is some weeks old and thus in a sense the children's specialist has very little experience of the newborn. Our medical students are not taught, and our midwives and maternity nurses are not taught, because there is no one to teach them, and the consequence is that breast-feeding is almost universally conducted so badly that, sooner or later, artificial feeding is resorted to as the lesser of two evils. I maintain that there is a great deal to learn about breast-feeding, and a great deal that requires teaching, and I consider that in every training center for midwifery practice, both medical students and maternity pupils should be taught by some person specially deputed for this duty, and who makes a specialty of this branch of medicine. In this article I propose to call attention to some of the commoner mistakes which are made in the management of breast-fed infants, and especially during the first few weeks of life.

According to the view I take, one of the first and most serious mistakes that we can make is to give the newborn infant the statutory dose of castor oil. Nature has provided the intestine of the newborn infant with that highly unattractive substance called meconium for a good and sufficient reason. It serves, indeed, a double purpose, firstly, it acts as a *"corpus vile"* on which the inexperienced intestine can exercise its tyro efforts at defecation, and, secondly, it serves as a most perfectly designed intestinal lubricant—two most important functions. The newborn infant, if left to itself "without benefit" of medicine, will pass two, or possibly three, meconium actions during the first day, one or two on the second day, and from that time forward semi-meconium and semi-milk motions which will depend for their number and consistency on the functional activity of the mammary gland and on the consuming powers of the infant.

The mechanism of defecation depends on a somewhat complicated nervous reflex, which after a time acts rhythmically and automatically. As in the case of all other automatic nerve mechanisms, a succession of normal stimuli must reach the nerve centers concerned in proper sequence if an orderly and rhythmical response is to be given. Under normal conditions meconium serves this purpose most excellently, the stimuli are neither too strong nor too weak, and their sequence and order are such as produce, as it were, an automatic flush-out of the rectum about every eight hours. The regularity and efficiency with which these centers ply their automatic functions depends very largely on the nature and character of this early training—this meconium training. There is nothing more damaging to a young center than over-stimulation, and there is no worse form of education for the inexperienced centers of defecation than over-stimulation with castor oil, glycerine suppositories or soap-and-water enemata. All these violent expedients exhaust the centers and leave a reactionary constipation. Unfortunately it is a routine practice in most maternity institutions to sweep the intestine through from end to end with a dose of castor oil or castor oil and olive oil mixed, before the infant is many days old, and it is impossible to say whether this practice is a worse lesson for the nerve cells in the lumbar cord which constitute the defecation centers, or for the students and midwives who witness the performance. But as I have already indicated dislocation of the automatic functions of the defecation centers is not the only injury inflicted on the growing organism when it is deprived of its natural supply of meconium during the early days of life.

The epithelial lining of the intestine is a very delicate and sensitive structure, easily damaged, easily torn off and easily stimulated. Meconium seems most nicely adjusted to preserve and protect so delicate a mucous surface, until such time as it is replaced by the normal constituents of an infant's stool. Personally I believe that many a colitis is determined in young infants by this premature sweeping out of the meconium, and more especially in cases of artificial feeding when so indigestible and irritating a substitute as cow's milk is given in place of colostrum or human milk. In the stools of infants mal-treated in this way it is usually possible to isolate considerable pieces of mucous membrane which have been torn off the bowel wall by the dys-peristaltic movements of an unlubricated and mechanically disorganized intestine.

Breaches of continuity in the epithelial surfaces must predispose to bacterial invasion and general infections. I have several times noticed the same untoward sequence of events—I mean the determination of a colitis with tormina, etc.—when the meconium has been precociously expelled into the amniotic fluid during intra-uterine life. Meconium should be treasured up in the bowel, and regarded as one of the best friends the young infant can possess. So important to my mind is the function of meconium that when it is deficient in quantity, or prematurely expelled by accident or undue interference, I always take care that it is replaced by an efficient substitute. The best substitute that I have so far been able to discover is, without doubt, petroleum emulsion. Petroleum is a good lubricant, and like meconium it is not assimilated by the epithelial cells, and thus reduced in bulk as it descends the bowel—that is to say, it reaches the rectum intact. It is physiologically an inert substance; it is protective, lubricant and soothing. In fact, so satisfactory does its administration prove that I now give it in all cases in which the infant suffers from tormina, entero-spasm or dys-peristalsis. When prepared according to the following formula I find infants take it well.

PETROLEUM EMULSION.

Liquid Paraffin, Brit. Pharm.	20 drops
Benzoic Acid	$^{1}/_{32}$ grain
Saccharin	$^{1}/_{32}$ grain
Oil of Cinnamon	$^{1}/_{16}$ drop
Decoction of Irish Moss, sufficient to produce.	1 teaspoonful

DOSE.—A teaspoonful to a tablespoonful from three to six times a day.

I would here utter a word of caution against the indiscriminate use of some of the largely advertised petroleum emulsions, partly for the reason that their flavoring and method of manufacture are not calculated to benfit infants, but chiefly because they may contain such supplementary bodies as hypophosphites which are not required by infants, and which cannot be given safely, except in very small dosage. With an emulsion of the formula here given the dosage may be as large as 2 ounces a day, divided into as many doses as the baby receives feeds, or as small as one teaspoonful in the twenty-four hours. Such an emulsion is an excellent vehicle for all the drugs that are usually administered to infants, and it matters little whether such drugs be soluble or insoluble provided the emulsion itself is well shaken before it is poured out of the bottle.

Let me then briefly summarize some of the more important points referred to in the preceding pages.

Meconium subserves the definite function of an intestinal lubricant, it protects the delicate mucous membrane from damage or friction due to food or foreign material which finds its way into the bowel, and pending the advent of the normal constituents of the infantile stool it affords the bowel wall a suitable substitute on which to practice its normal functions. In view of the important physiological function of meconium, it should never be expelled prematurely by castor oil, nor by any other aperient, and if accidentally dislodged it should be replaced by an efficient substitute such as petroleum emulsion.

Though a matter of trifling importance, and one that concerns artificial-feeding, perhaps, as much as breast-feeding, I would draw attention to the frequent incidence of "thrush" in young infants owing to the damage inflicted on the mucous membrane of the buccal chamber by the act of antiseptic or aseptic ritual which is usually called "careful" cleaning of the mouth. I think it is impossible to insist too strongly on the fact that breaches of continuity in the surface epithelium of skin or mucous membrane cause or rather invite infection. Eczema and surface inflammation of the epidermis may arise from too vigorous a use of the towel, and Bednar's aphthæ, aphthous ulcers, and "thrush" not infrequently follow post-prandial ablutions of the mouth, if these are conducted with too much energy, with coarse flannel or other material of rough texture. I find "thrush" far more commonly present when the mouth has been "carefully" cleaned than when it has been left, so to speak, "dirty." In certain institutions in Germany the practice of wiping the mouth out with a piece of rag has dropped into desuetude owing to this supposed causal connection between oral inflammations and oral lustrations. The instinct of cleanliness must in this connection, as well as in many other departments of infant management, be tempered with respect for surface epitheliums. The second suggestion, then, that I venture to offer to those who are responsible for the management of young infants is: *Keep the mouth clean by the physiological method of preserving an intact mucous lining rather than by cleaning out the mouth with a linen rag or other coarse material.*

I now come to a matter which seems to me of very great importance in breast-feeding, and that is the management of the number of feedings.

The custom of feeding the newborn infant every two hours, both by day and night, has been sanctioned by immemorial practice in this country: frequent feedings of this kind are also usual in many other countries, notably in America. Some years ago when a certain learned German professor came over to London to inquire into the methods of English feeding he told me that in no clinic except my own had he observed any other practice than that of two-hourly feeding. He spoke very highly of the four-hourly method, and even urged the advantage of only five feeds in the twenty-four hours. At that time it was my practice to feed newborn infants every two hours, and by carefully graduated increments to prolong the intervals of rest up to three hours, but intervals longer than three hours during the day I never recommended. I now see the error of my ways and admit my obligation to my German friend for drawing my attention to so important a matter. Although for the prejudiced proletariat I find it impossible to insist on this counsel of perfection, among my private cases I always advise long intervals of rest between feeding. Bearing in mind the desirability of establishing rhythmical habits of activity in so important a function as that of digestion, I attach great importance to exact hours of feeding. I do not believe in the principle of allowing infants to dictate terms either in respect of the times of feeding, or of the amount of food they are to receive. The infant should be fed at perfectly regular intervals, and, if need be, awakened to fulfil this condition. Further, the infant should have a full and sufficient feed—this is one of the most essential conditions for securing that sense of *"bien être"* which secures both sleep for the baby and rest for the mother. Besides there are advantages in a stomach possessing good reserve powers. A stomach should be elastic, capable of holding an ample meal, and of contracting well when it is again empty. Now I admit that there are difficulties in ensuring a good meal of this kind at the commencement of lactation, especially when the mother is a primipara. Some breasts will only secrete quite a small amount of milk, perhaps not enough to satisfy the infant and keep it quiet for three hours, sometimes not enough to keep it quiet for one hour. In a most interesting paper by Professor Hans Rietschel,* this fact has been clearly indicated, and this observer, while he admits the advantages of the four-hourly feeding, recognizes also the claim for more frequent meals when the total consumption of milk in the twenty-four hours cannot be maintained at a physiological standard by this "long interval" method. Whatever method is adopted it must not be left to chance to determine how much milk the infant is to receive in the twenty-four hours. The chief cause of failures in the management of breast-feeding is the omission to estimate how much milk is consumed either at a single feeding or during the twenty-four hours—I could write a long article on my experiences of the catastrophes I have witnessed by omitting to take this simple precaution.

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* *Jahrb. f. Kinderhk.*, April, 1912, p. 403.

Hungry infants have been ordered off the breasts because the mother has not been supposed to be able to supply their needs, when the quantitative estimation proved at once that the infant was not only receiving enough, but sometimes a great deal too much. Wasting infants are sometimes kept at the breast because the doctor asserts that human milk affords the only prospect of life, although a test feed shows unequivocally that the infant is drawing no adequate sustenance from its mother's breast. I will not occupy time or space by referring specifically to the many accidents which may follow the haphazard methods usually employed. In my opinion all infants who are not progressing satisfactorily on the breast, and, possibly, even those who are apparently thriving, should be given a "test-feed" as a routine practice, for it is absolutely impossible to manage breast-feeding in a rational and scientific manner without doing so. Now my view, in contradistinction to that of Professor Rietschel, is to adhere to the four-hourly intervals, or, at any rate, to the three-hourly intervals, and if the breast does not yield enough milk not to decrease the intervals, but rather to make good the insufficiency by a supplementary feeding given immediately after the breast, and consisting of food of an appropriate quantitative consistency. On the importance of the qualitative nature of this supplementary feeding I shall have more to say anon.

But for the moment confining myself strictly to quantitative considerations I would like to ask certain questions which I believe to be of importance. What is a physiological allowance for an infant of any particular age or of any particular weight? Although I appreciate as much as do most physiologists the value of Rubner's work on food values and food requirements, and Hübner's work on the food requirements of infants, I have an instinctive distrust of the caloric method in its application to infant feeding. It may be quite useful to keep in our heads the general formula that food of the caloric value of 100 units per kilogram of body weight of infant is essential for the maintenance of nutrition and growth, but beyond such general statement the formula has no precise application. The invaluable researches of F. Gowland Hopkins* shows that whatever theoretical value such estimation may have for adult and fully grown individuals, in practice they are often entirely vitiated by minor and often ignored factors connected with quality which are of the utmost importance in the case of the growing animal.

I was on the point of saying that an infant was different from an engine which performs so many foot pounds of work by virtue of the consumption of so many pounds of fuel, but on reconsideration I would rather say that an infant is exactly like an engine in this respect, for its capacity to convert potential energy into heat or kinetic energy depends entirely on its index of efficiency and on the nature as well as on the quality of the fuel. As there are economical and wasteful engines, so are there economical and extravagant infants. Some infants by reason of efficient powers of digestion, absorption and internal metabolism can extract the full value from the food given them; others starve in the midst of plenty and poison themselves by the products of perverted metabolism. I have known many an infant thrive on the most preposterously small rations of breast milk, or rations which, estimated on their seeming caloric value, defied all the laws of the conservation of energy. These are the cases in which the theoretical caloric requirements of an infant are of value. No infant should be allowed to subsist on a minimal dietary, no matter how well maintained its general condition of nutrition may appear to be.

It is far better that an infant should be over-fed than that it should be under-fed, that is to say, provided that its physiologic reactions are normal. An active metabolism is a distinct advantage—it represents a reserve power. On the other hand, if an infant fails to thrive on a diet which by the caloric estimation is amply sufficient, it is clear that the infant owes its condition to some other fault than actual starvation, and under such conditions it behooves us to investigate the additional factors, beyond caloric values, in the diet which may possibly help to explain the failure. In breast-feeding it must be very clearly understood that the qualitative values of the milk are immensely important, and these values, especially in respect of the protein elements, cannot be estimated by chemical tests. Summarizing, then, the important points in the above suggestions, I may say that from birth onward the system of four-hourly or three-hourly feedings *offers great advantages provided the total quantity of food consumed is checked by the "test-feed" and found to conform to physiologic requirements, and provided, also, nutrition is well maintained. If the quantity of milk consumed falls short of normal standards, it must be made good by supplementary feedings from the bottle.*

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* *Journal of Physiology,* July, 1912.

For many years past it has been my routine practice to estimate by means of the "test-feed" the amount of milk consumed by all breast-fed infants attending my clinics. That is to say, on her first attendance a mother is instructed to be prepared to feed her infant at her next visit, and to leave an interval of three hours between the time of attendance and the last feeding. The infant is carefully weighed on accurate scales before it is put to the breast, and then again after the meal is completed. The difference in the two weighings represents the weight of the food consumed. An analysis of the records thus kept shows some truly remarkable figures.

It proves, for instance, that infants of the class usually brought to my clinic do not obtain progressively larger quantities of milk as they grow older, but that the quantity consumed remains practically constant throughout the first nine months of life, or if the infants are fed at longer intervals as they grow older, the total amount consumed may be, in some instances, even less than it was during the early months of life. When we compare the average amount of breast-milk consumed by the infants attending at my clinic in St. Marylebone, or at my outpatient department at the Queen's Hospital for Children, with the amount of diluted cow's milk usually ordered for infants artificially fed, the contrast is indeed striking, as may be observed by examining the accompanying table:—

TABLE I.

To show the average amount of milk consumed by certain groups of breast-fed infants with the comparative amounts consumed by the average infant artificially fed during twenty-four hours.

Age of Infant	Month 1st	Month 2d	Month 3d	Month 4th	Month 5th	Month 6th	Month 7th	Month 9th
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
Breast-fed cases in Borough of St. Marylebone consume	15.5	16.38	16.02	15.85	13.	18.25	20.66	12.
Breast-fed cases in Royal Borough of Kensington consume	15.5	20.	14.5	13.2	17.2	21.5	15.04	26.2
Breast-fed cases in Queen's Hospital for Children consume	9.71	18.15	14.3	11.66	9.16	16.25	12.	12.
Artificially-fed London child consumes	25.	30.	30.	36.	40.	42.	42.	48.

There is something very contradictory in these figures. Either many breast-fed infants are cruelly underfed, or artificially-fed infants receive far too much. Estimates of the amount of food required by infants have been largely worked out by the empirical method of estimating the amount of breast milk which is consumed by healthy infants making normal progress. These experimental infants are necessarily kept under close observation in institutions where the hygienic conditions are good and the mothers well cared for. But the conditions are quite different among the class of infants who are brought to the out-patient departments of our large hospitals. Owing to indifferent hygienic surroundings these infants carry on life at a much lower level. They enjoy less light, less sun, less air, and experience fewer of all those vitalizing stimuli which provoke and excite cellular activities and internal metabolism. Their capacity for utilizing food is less than that of infants living under better hygienic and sanitary conditions. Hence they can live on apparently starvation rations, and is a very doubtful question whether they thrive better when they are supplied with amounts of artificial food which are usually recommended in leaflets, or when they are fed on the smaller amounts of food which corresponded to their own mother's supply.

My own personal view is that, if a breast-fed infant has been faring badly, say on 20 ounces of breast-milk a day, it is not calculated to do well on 40 ounces of cow's milk, or, at least, not without some preparatory training. The infant's metabolic process must be gradually expanded by new experiences before it can digest and assimilate such relatively large quantities of food, and, if possible, the hygienic conditions must be improved and new forms of stimuli introduced, in order that its vital processes may be quickened. I therefore submit that the estimates which have been founded on institutional experiences in Germany have no exact application for infants living under the inferior hygienic conditions of our town slums. It is of interest to compare the average amount of breast milk consumed at a feeding, and during the twenty-four hours, by infants attending at my two clinics and at Dr. Carter's clinic in Kensington, with the amount of breast milk obtained according to Beuthner, Feer, and Hachner by infants of corresponding age; and, for the comparison, I commend to my readers' notice the accompanying table:—

TABLE II.

Showing the average amount of milk consumed at a test-feed during the various ages up to nine months according to different observers.

	Weeks			Months							
Age	2	3	4	2	3	4	5	6	7	8	9
	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.
Marylebone figures............	1.87	1.62	1.95	2.04	2.26	2.23	3.0	2.81	3.08	2.67	..
Kensington figures............	..	1.75	1.85	1.8	2.0	2.15	2.5	2.67	2.72	2.9	3
Queen's Hospital figures.......	..	1.0	1.47	2.0	1.84	1.35	2.18	3.0	2.08	..	..
Peters' figures.................	2.4	2.7	2.87	5.42	..	..	..	..	..	..	..
Camerer's figures..............	2½	3½	3½	3½	4½	3½	..	..	..	..	..
Beuthner's figures............	2	2¼	2¾	3¼	4½	4½	5	..	..	..	..
Feer's figures..................	2.5	2.8	3.5	4.0	4.5	4.8	4.8	..	..	..	..
Hachner's figures..............	2½	2½	3	5¼	5½	5¼	5½	5½	7	..	..

It will naturally occur to those who read these figures that such serious discrepancies must be due to the fact that the infants attending Dr. Carter's clinic and my own were debilitated or actually ill, whereas those in the German institutions were normal and well. It is true that the Queen's Hospital cases were infants who had been, or were, ill, but my Marylebone cases and Dr. Carter's cases were, for the most part, as sound or sounder than the average London baby found in slum districts and were, on the average, gaining normally in weight.

In my clinics I make very considerable use of supplementary feedings, whereas Dr. Carter gives no additional food, however small may be the breast supply, as long as the infant's weekly increment in weight remains satisfactory. That the meagre breast supply revealed by our observations in London is not a national idiosyncrasy, but merely due to the low standard of nutrition obtaining in the slum mother and infant, is shown by the fact that Dr. Carter and I both find among our private patients in London that the breast-milk supply is usually most abundant. In view of the great differences in the capacities of different women to secrete milk, it seems to me very desirable that the "test feed" should be more generally employed. The evidence it affords is most useful as a means of diagnosis, and it is quite essential to the management of weaning and supplementary feeding. Certain deductions may, indeed, be made from these figures; among them I would include the following:—

The general mortality and morbidity statistics in England, when such can be obtained, show that breast-feeding, bad as it is, gives better results than artificial feeding. This is not my personal experience either in my private practice or in my public services. I find on the whole artificial feeding can give results no less good than natural feeding, and I attribute this largely to the fact that my experiences with the "test feed" have taught me to be more careful when dealing with infants artificially fed not to rely on theoretical standards in estimating the amount of food to be given to such babies, but to rely on physiologic tests and actual observations.

Infants are, as a rule, fed artificially because they have failed to thrive on the breast, thus their digestion and metabolic processes are usually thoroughly upset before they begin the artificial dietary. It is therefore not altogether fair to ascribe all the bad results of artificial feeding to intrinsic defects of this method; most of these results may be regarded as the aftermath of defective breast-feeding. None the less, I feel sure that many of these consequences could be avoided if those who are responsible for the management of this artificial feeding would acquaint themselves, by means of the "test feed" systematically applied, with the average quantities of food breast-fed infants actually receive. If they were to take this obvious precaution they would not expect an infant three months old and previously breast-fed, when weaned, to be a success on 4 or 5 ounces of diluted cow's milk given every two or three hours. The following table, which shows the average amounts of breast milk consumed by certain groups of infants during the twenty-four hours, may be of interest. For further particulars the reader is referred to the *Lancet,* September 2, 1911.

TABLE III.

Showing the average amount of milk consumed in the twenty-four hours by infants of varying ages.

	Weeks			Months							
Age	2	3	4	2	3	4	5	6	7	8
	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.
Marylebone figures............	18.8	14.77	13.46	16.38	16.02	15.85	13	18.25	20.66	12
Kensington figures..............	..	16.5	14.5	20	14.5	13.2	17.2	21.5	15.4	26.2
Queen's Hospital figures......	8	..	9.71	18.15	14.3	11.66	9.16	16.25	12	12
Camerer's figures..............	19	20	28	28	28.25	30.5	33	33.5	..	..
Feer's figures...........	17.5	15	20	27.5	26.25	27	28	34	30.5	..
Beuthner's figures....	13	18	19.5	27	28.5	28	..	..	..	..
Peters' figures..................	16	17	20	21	..	..	..	..	..	..
Hachner's figures	15	19	19	28	28	26	30	33	44	..

The teaching of the "test-feed" when systematically applied shows that, as far as London children are concerned, *the amount of breast milk they secure is enormously below the usually accepted estimates, a fact which suggests many modifications, not only in method of conducting breast-feeding, but also, in a quantitative respect, in our method of artificial feeding.*

Now as regards the qualitative properties of breast milk, I have very little to say, except that on this count the analysis of the chemist provides us with comparatively useless information, for it takes no cognizance of the one really important factor, namely, the nature and character of the nitrogenous elements which the sample of milk contains; there may be present in milk poisonous albumins or toxins of which the chemist can tell us nothing. The only test of any value is the physiologic test, that is to say, the effect on the baby.

We can say very little more than this at present, if, as shown by the "test feed" the infant obtains neither too much nor too little milk, and still does not thrive, then the milk is probably of inferior quality.

If, on the other hand, the quantity is deficient, the deficiency must be made good by some artificial addendum. On the subject of the quality of these artificial addenda I have a few words to say.

I think it may be accepted as an axiom that the young infant is never at first capable of digesting a new article of food. Dr. Robert S. Frew* has shown by researches carried on at Great Ormond Street Hospital that a child takes some three days or so to learn to digest a new carbohydrate. Newborn infants cannot digest even milk-sugar; they must be taught to perform even this comparatively easy task by gradual stages, and for this purpose nature supplies in the colostrum a simple monosaccharide sugar (dextrose) and not lactose, which is a disaccharide, and the substitution is gradually effected during the following days as true milk is secreted. What is true of sugar is almost certainly true of albuminous or nitrogenous articles of food; that is to say, infants require several days to learn to digest a new variety. Moreover, we have the analogy of the slow and somewhat tedious acquisition of immunity by infants; and immunity, it must be remembered, is clearly dependent on a specific nitrogenous metabolism or internal digestion.

This knowledge ought to be of the greatest assistance in finding artificial substitutes or complements in breast-feeding. No new food can be digested at first; therefore if you must give a new food give the organism an opportunity of learning how to digest it before you overwhelm it with large quantities or with an impossible task.

The simplest plan is, of course, to give at first only minute quantities of a new food and to increase the amount by small daily increments. But it sometimes happens that an infant has to be weaned suddenly, and that it must be kept alive while it is learning to digest. Under such circumstances a good plan is to give milk which has been pancreatized, or otherwise artificially digested for forty-five minutes, and subsequently as the function of digestion develops the milk can be pre-digested for a shorter and shorter time—say one minute less every day. Then at the end of forty-five days, when the infant's powers of digestion are well and adequately developed, the milk is given without any previous digestion at all. I get better and more reliable results by this method than I have succeeded in obtaining by any other.

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* *Lancet,* November 4, 1911, p. 1264.

It is occasionally found in hospital practice without chemical analysis and by mere inspection, that a mother's milk, though abundant in quantity, is very thin in quality. Under such conditions if we increase the milk by supplementary feedings of peptonized milk we run the danger of mechanically overloading the stomach. To obviate the difficulty I have adopted the following plan with most excellent results. I tell the mother to give the infant at the end of such feeding an appropriate quantity of undiluted "full-fat" condensed milk, the milk to be "licked out of the spoon." In this way the danger of distending the stomach is obviated.

To summarize the preceding suggestions, I would say that *from a qualitative point of view the character of the proteid bodies contained in milk are most important; these cannot be recognized otherwise than by their physiologic effect on the infant. It must be remembered that an infant requires time to learn to digest a new food and that therefore new foods should only be given at first in very small amounts or in a predigested form.*

THYMIC TRACHEOSTENOSIS AND THYMUS DEATH.—A Crotti (*Journal of American Medical Association*, February 22, 1913) reports 2 cases of this condition in addition to the 5 that he has already reported. What may be called a latent thymus hyperplasia may occur in children and not come under the surgeon's care. Sudden death may occur without prior symptoms, but there are generally vague respiratory troubles and other signs of ill health. Certain cases of asphyxia of the newborn are explained only in this way. The most striking symptom of the condition is dyspnea, labored respiration or severe choking spells, often alarming to witness. Tracheotomy is useless with the present style of short tubes and longer ones should be provided with every tracheotomy set. The dyspneic symptoms usually appear early and diminish after the second year of life, rarely appearing later. Pressure on the windpipe by the enlarged thymus occurs either at the superior opening of the thorax (mostly in children) or, especially in adults, between the brachiocephalic trunk and the common carotid. In still other cases direct pressure on the base of the heart, affecting the heart ganglia, may be the cause of sudden death. Thymus enlargement frequently accompanies hyperthyroidism and simple goiter, but its relations to the thyroid are not clear.—*Medical Record.*

A CASE OF ABNORMAL PHYSICAL AND SEXUAL DEVELOPMENT IN AN INFANT OF TWO YEARS, PROBABLY DUE TO A TUMOR OF THE PINEAL GLAND.

BY JOHN LOVETT MORSE, A.M., M.D.,

Associate Professor of Pediatrics, Harvard Medical School; Associate Visiting Physician at the Children's Hospital and at the Infants' Hospital, Boston.

John P., twenty-three months old, was the fourth child of healthy parents, both of whom were born in Finland. There was no history of deformities or mental defects in either family and the three older children were well and normal in every way.

He was born at full term and was normal in size and shape. He was nursed for a year, since when he had eaten everything. He had never been ill, but had been subject to cough since he was two months old. He began to grow very rapidly when he was about six months old. His weight was said to have been 29½ pounds when he was a year old and 37 pounds when he was seventeen months old. It is very doubtful, however, if these weights were accurate. He cut his first tooth at seven months. He sat up alone at seven months and walked with assistance at sixteen months. His voice became harsh when he was sixteen months old. His parents insisted that he said "papa" and "mamma" when he was seven months old. His vocabulary had not increased since then, however, although his parents thought that he tried to talk. He was usually good-natured. He began to have laughing spells, lasting five minutes or more, when he was five months old, which were followed after a time, according to his parents, by general convulsions. These spells occurred almost every day. There seems to be some doubt as to these convulsions, however, because during the three weeks which he was in the Children's Hospital, although he often laughed foolishly for some time, he not only had no general convulsions but nothing in any way to suggest them. His appetite was said to be very large, but while under observation he ate no more than would be expected from his weight. There was no polydipsia. There was a slight tendency to constipation but no evidences of indigestion.

Physical Examination.—He was very large in every way. His face looked like that of a much older, but not very bright, child. His intelligence was about that of a baby of sixteen or eighteen months. He said "papa" and "mamma," but nothing else. He made many inarticulate noises, some of them in a high-pitched voice, more in a rather deep bass voice. He was interested in people and, to a certain extent, in playthings. He preferred, however, to play with his fingers and toes. He was usually happy. He would take bread in his hand and eat it, but would not take a glass and drink out of it. His head was somewhat flattened on top. The fontanels were closed. The lower jaw was not enlarged. Roentgenographs showed no enlargement of the sella turcica. His hair was a little coarse and sparse. He held his head up well and sat up with a straight back. He both saw and heard. The fundi were normal, as were the drum membranes. There was some nasal discharge, but he kept his mouth shut and did not drool. The tongue was normal. He had twenty teeth, but the upper ones were badly decayed. The tonsils were somewhat enlarged. There was no spasm or paralysis of any of the muscles supplied by the cranial nerves. The neck was normal. There was no increased dullness under the manubrium and the thymus was not palpable in the suprasternal notch. There was no enlargement of the thyroid. The chest was of good shape and there was no rosary. The heart and lungs were normal. The upper border of the liver flatness was at the upper border of the fifth rib in the nipple line, the lower border was palpable 1 cm. below the costal border in the same line. The spleen was just palpable. The kidneys were not palpable. The level of the abdomen was that of the thorax. Nothing abnormal was detected in it. There was a very small umbilical hernia and bulging at both inguinal rings. There was slight enlargement of the epiphyses at the wrists and ankles. There was slight bowing of the bones of the forearm, a little anterior bowing of the femora and considerable outward bowing of the lower portions of the tibiæ. The distance from the anterior superior spine to the sole was 47 per cent. of the total length (the average at birth is 43 per cent., and at five years 54 per cent.). The hands and feet were not enlarged. He was able to stand and walk, but did both very unsteadily. The knee-jerks were equal and normal. Kernig's and Babinski's signs were absent. There were numerous glands, varying in size from that of a bean to that of a marble, in the neck, but none elsewhere. There was a large amount of pubic hair and a slight excess of hair in the axillæ about the nipples and on the anterior surface of the legs. There was no excess of hair on the face. The penis was very large, measuring 7½ cm. in length when flaccid and 10 cm. when erect. The testicles were the size of robin's eggs. He showed no evidences of sexual feeling and repeated examinations of the centrifugalized urinary sediment failed to show spermatozoa.

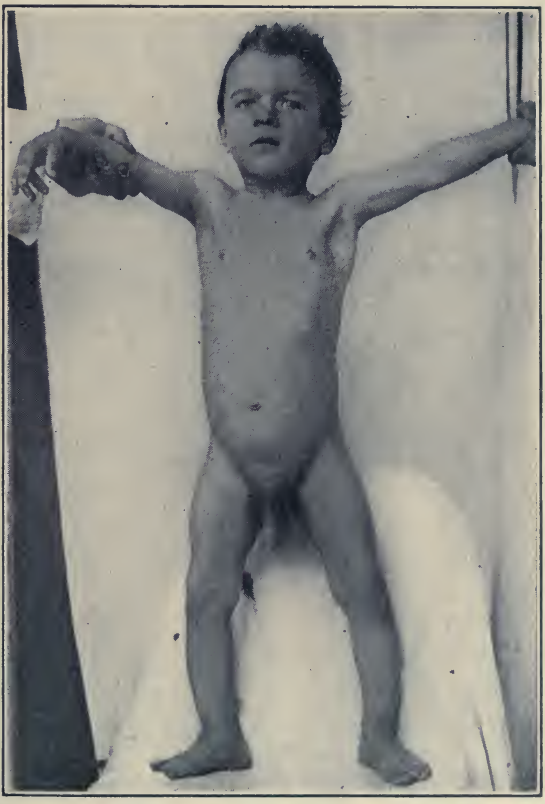

FIG. 1.—John P., 23 months old.

MEASUREMENTS.	John P.	Normal at 2 yrs.	Normal at 4 yrs.
Body length, crown to sole . .	98 cm.	82.8 cm.	96.7 cm.
Circumference of head	52 "	48.2 "	50.3 "
Circumference of chest	54 "	48.4 "	52.8 "
Weight	35 lbs.	26.5 lbs.	35 lbs.

Urine.—The urine was pale in color, clear, acid in reaction, of a specific gravity of 1,020 and contained no albumin, sugar or acetone. The centrifugalized sediment showed an occasional epithelial cell and leukocyte.

Blood.—Hemoglobin	80	per cent.
Red corpuscles	6,500,000	
White corpuscles	9,000	
Lymphocytes	26	" "
Transitional forms	6	" "
Polynuclear neutrophiles	65	" "
Eosinophiles	3	" "

There was slight achromia and slight variation in the size and shape of the red cells. There was an occasional rather large red cell, not quite normal in color. The blood platelets appeared about normally abundant.

Wassermann Test.—The Wassermann test was negative.

Von Pirquet Test.—The von Pirquet test was negative.

Blood Pressure.—The systolic blood pressure was 85 mm.

Roentgenographs.—Roentgenographs showed a bony development corresponding roughly to that of a child of six and one-half years.

The most striking abnormalities in this boy are the general, but symmetrical, physical overdevelopment and the precocious sexual development in association with the delayed mental development. It is very evident that these abnormalities must be due to some disturbance of the function of the glands of internal secretion concerned with the growth of the body and the development of sex characteristics. The glands, the disturbance of whose function might reasonably cause the abnormalities present in this boy, are the pituitary, the pineal and the adrenal.

The absence of enlargement of the sella turcica in the radiograph counts against a tumor of the pituitary, but does not, of course, rule it out or exclude hypersecretion of this gland. The age of the child, the absence of enlargement of the jaw, hands and feet and the marked development of the sex characteristics are, however, sufficient to exclude tumor or hypersecretion of the pituitary body as the cause of the peculiar manifestations.

There can be no doubt that the adrenals through their internal secretion influence the growth of the body and the development of the sex characteristics. There is also but little question that it is the cortex which is concerned with those functions, not the medulla.

There may be diffuse hyperplasia of the cortex, passing gradually into adenomata, and there are two main types of malignant growths of the cortex, sarcomata and hypernephromata. All of these may be associated with hypersecretion of the gland. Lesions of the cortex which develop in intrauterine life are usually bilateral; those that develop after birth, unilateral. The manifestations of disease of the adrenal cortex vary according to the age at which it develops.

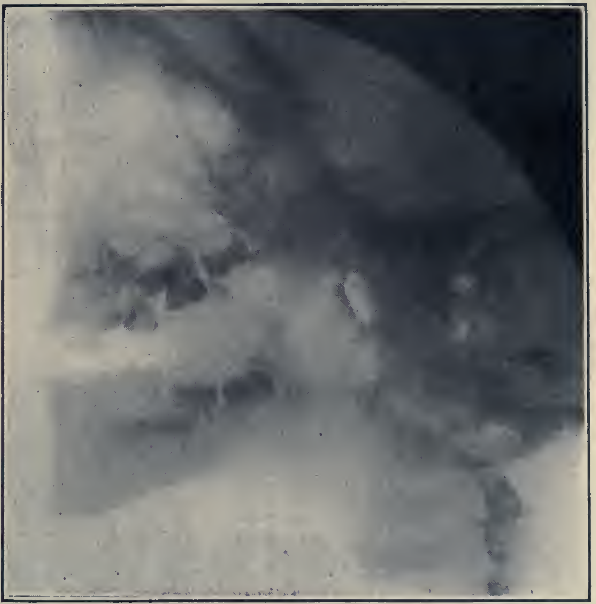

FIG. 2.—Normal sella turcica. Unusual development of teeth.

If it develops early in intrauterine life, pseudohermaphroditism results. The internal organs are feminine, but the infant has the appearance of a cryptorchid boy, with a well-formed penis, sometimes with a little hypospadias, the scrotum being empty but not cleft. The vagina narrows at its lower part and connects at the level of the neck of the bladder with a well-developed prostate and opens into the prostatic portion of the urethra at the level of the summit of the verumontanum by a rather small orifice. The prostate and urethra are of the masculine type. If the disease develops later in intrauterine life there is no question as to the sex of the infant, but there is atrophy of the uterus and ovaries, enlargement of the clitoris and premature hypertrichosis.

When the disease develops before puberty there is a general overgrowth of the body, often marked obesity, excessive development of the sexual organs and hypertrichosis. The intellectual development is usually impaired. Glynn has collected 17 cases, proved by autopsy, in children. Fourteen of these were in females and three in males. Hypertrichosis and enlargement of the clitoris were marked in many of the girls. Two of the boys

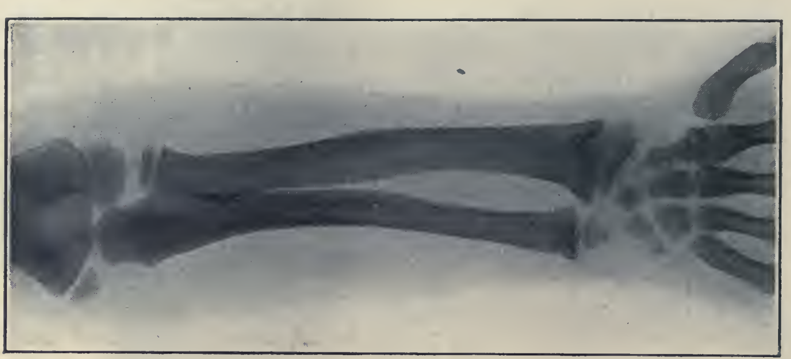

FIG. 3.—Bony development that of 7 or 8 years.

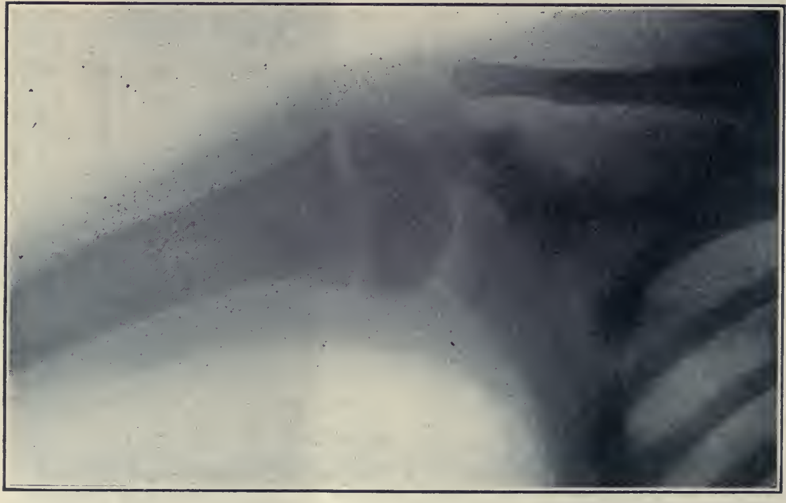

FIG. 4.—Bony development at shoulder greater than at 6 years.

(dying at sixteen and four and three-quarter years) had hair on the face, two (dying at five and sixteen years) showed great muscular strength and one (dying at five years) development of the sexual functions.

When the disease develops during the period of sexual activity, and this type also almost always occurs in women, the symptoms are cessation of menstruation, pronounced obesity and the appearance of hair all over the body, especially on the cheeks and chin. When it develops late in life the only symptom on the sexual side is hemorrhage.

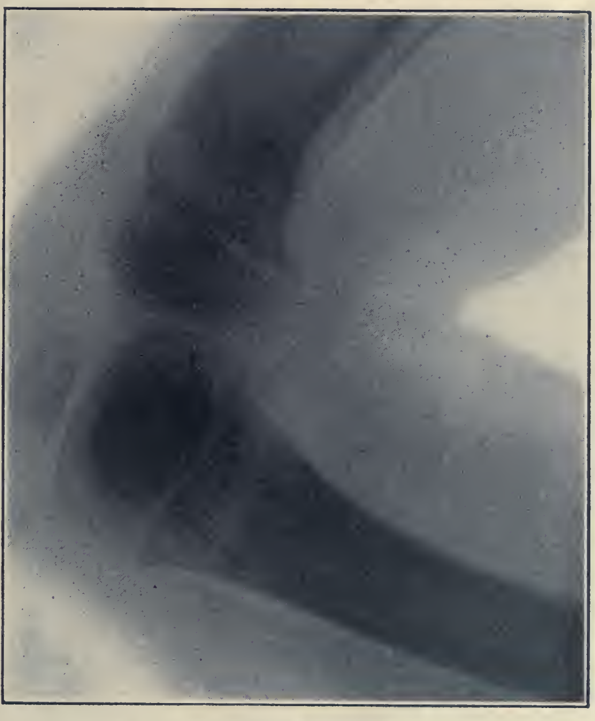

FIG. 5.—Bony development at knee greater than at 5 years.

It is very noticeable that disease of the cortex of the adrenals occurs much more frequently in females than in males. It is also most noticeable that when the disease occurs in females it results in a diminution of the female and an increase of the male primary and secondary sex characters, while, when it develops in the males, there is an increase in the male but no appearance of female characteristics.

Tumors of the pineal gland are uncommon, but Neumann collected 22 from the literature in 1901 and a number have been reported since; 19 of his cases were in males and 3 in females, while the majority were in children. Nearly half of them were sarcomata, carcinomata and teratomata being the next most common. Tumors of the pineal gland are occasionally associated with changes in sex characters, particularly true precocious sexual development. Glynn, writing in 1912, was able to find 5 cases, proved by autopsy, in children, associated with precocious sexual development. They were all boys.

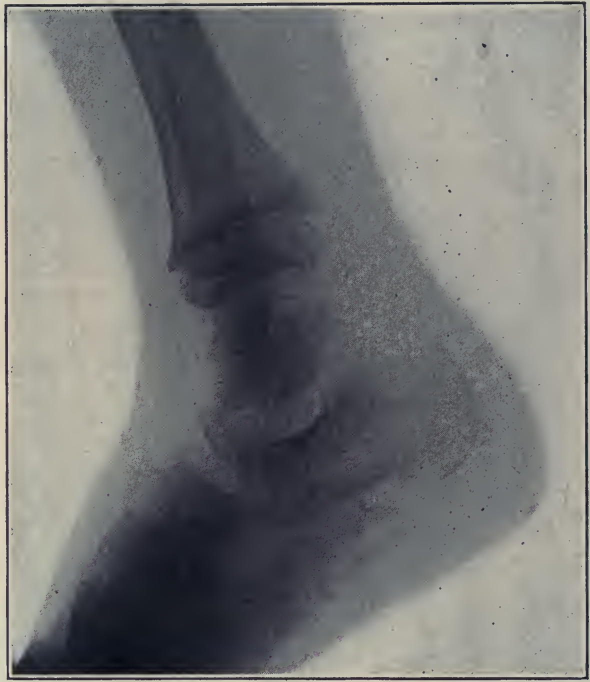

FIG. 6.—Epiphysis of os calcis developed. Normally appears at 9 years.

The symptoms of tumors of the pineal gland, outside of those connected with the sex characters, are those of tumors of the base of the brain in general and are not characteristic enough to justify a positive diagnosis. The most common symptoms are disturbances about the eyes, which are found in almost all the cases. Optic neuritis is very common, while headache, deafness and dizziness are not uncommon. Polydipsia and polyphagia are present in many cases. The intelligence is usually not impaired at first, but mental dullness, merging into somnolence and coma, develops finally in most instances. Ataxia is common, but paralysis and disturbances of the deep reflexes somewhat unusual. The relative time of the appearance of the signs of precocious sexual development and of those of cerebral tumor are important in connection with the possibility of the presence of a tumor of the pineal gland in this instance, in which there are no symptoms of cerebral tumor. A study of the five previously reported cases of this condition in boys seems, therefore, worth while. The pituitary glands were normal in all these cases, except that of Raymond and Claude, in which there was atrophy from pressure. The adrenals were normal in the cases of Ogle and Oestreich and Slawyk; they contained nodular tumors and showed microscopic evidence of hyperactivity of the cortex and medulla in the case of Raymond and Claude; they are not mentioned in the others.

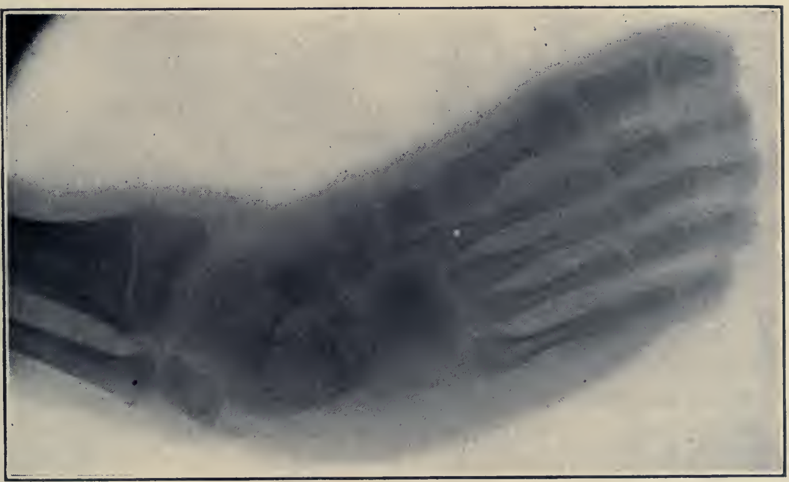

FIG. 7.—Development at approximately 8 years.

Gutzeit. Symptoms of cerebral tumor present for one and one-half years before death, at seven and three-quarter years. Only sexual abnormality was a marked growth of pubic hair. No statement as to how long this had been present.

Ogle. Was well until a few months before his death at six years. Early symptoms were strange manner, masturbation and sleepiness. When first seen, five weeks before death, he had a staggering gait and held his head rigidly, the pubic hair was fairly plentiful and the penis the size of that of a boy of sixteen or seventeen, but the testicles were not enlarged. He quickly developed signs of increased cerebral pressure, became blind and slept almost continuously, but was rational when roused. Priapism was a prominent symptom.

Oestreich and Slawyk. Healthy until three years old, when he became quiet and shy, and began to develop rapidly physically. His penis also became very large. About nine months later his gait became awkward and clumsy and he began to be dull. When first seen, a month after, when nearly four years old, he measured 108 cm. and weighed 20 kilograms, the average for this age being 92 cm. and 16 kilograms. There was a profuse growth of hair on the pubes, the penis measured 9 cm. in length when flaccid and the testicles were the size of pigeon's eggs. The breasts were 2 cm. high and contained colostrum. He was mentally clear. There was double optic neuritis, internal strabismus, nystagmus and impaired vision. He was slightly spastic and his gait was insecure. He developed further symptoms of cerebral pressure and died six weeks later.

Frankl-Hochwart. Normal until into third year. Then began to develop rapidly and at five years was the size of a boy of seven years. Developed very rapidly mentally at the same time. Squint appeared at five years and two months. Marked enlargement of the penis was first noticed when he was five years and six months old. This was quickly followed by growth of pubic hair and hair on the shins. He had frequent and marked erections and his voice became very deep. Headache, drowsiness and gaping appeared when he was five years and six and one-half months old. He was first examined when five years and seven and one-half months old, nine days before his death.

He was well developed and well proportioned, measuring 123 cm. He looked like a boy of nine years. The pubic hair was like that of a boy of eighteen. The penis was 7 cm. long and the testicles the size of hazel nuts. There was a little hair on the shins. The voice was deep. There was double optic neuritis with paralysis or paresis of many of the eye muscles. He died in coma after progressive failure.

Raymond and Claude. Well up to seven years, although rather large. Intelligence normal. Then had headache and vomited for a time, which recurred when he was eight and one-half years old and persisted for three months. At this time he began to grow both tall and large very rapidly, but became feeble muscularly. Ophthalmoplegia developed and sight became progressively feeble, resulting in blindness when he was nine years old. He measured 138 cm., which is the height of Parisian children of thirteen. He weighed 39 kilograms, the average of Parisian children of his age being 25 kilograms. He was clear mentally, but apathetic. Very feeble muscularly. Large head (hydrocephalus). Very fat, especially about the abdomen and thighs. Pubic hair developed as in a boy of fourteen or fifteen years. Slight growth of hair on upper lip and on cheeks. Genital organs very small, which may have been due to atrophy of the pituitary gland from the pressure of the tumor. Death, after progressive apathy and asthenia, at ten and one-half years.

The study of these cases shows that the data are insufficient in the cases of Gutzeit and Ogle. The signs of physical and sexual overdevelopment preceded those of cerebral tumor by nine months in the case of Oestreich and Slawyk, while those of physical overdevelopment preceded those of tumor for two years in the case of Frankl-Hochwart. The signs of oversexual development coincided in their appearance with those of cerebral tumor in this instance. The signs of cerebral tumor preceded those of physical and sexual overdevelopment in the cause of Raymond and Claude. It is evident, therefore, from the analysis of these cases that there is no general rule as to the relative time of the development of the signs of cerebral tumor and of those of overphysical and sexual development. It is also evident from the cases of Oestreich and Slawyk and Frankl-Hochwart that the evidences of overphysical and sexual development may precede those of cerebral tumor for some months or even years.

It is very difficult to determine in this instance whether the symptoms are due to a pineal tumor or to a tumor of the adrenal gland, as the symptoms of the two conditions may be so similar. His sex is strongly in favor of a tumor of the pineal gland; his age is consistent with either. The retarded mental development is somewhat in favor of an adrenal tumor. The normal condition of the fundi points a little, but not materially, against a tumor of the pineal gland, because optic neuritis does not develop until there is a considerable increase in the intracranial pressure and because these tumors may cause symptoms of overdevelopment before those of pressure. The absence of symptoms of involvement of the cranial nerves also points a little against tumor of the pineal gland, but their absence can be explained in the same way as that of optic neuritis. The precocious ossification of the bones is of no assistance in the diagnosis, because there are no data as to the condition of the bones in either condition.

It is evidently impossible, therefore, to determine positively whether the disease is located in the pineal gland or in the adrenals. The decision must be entirely a matter of opinion. The weight of the evidence seems to be, however, a little in favor of a tumor of the pineal gland. It is unfortunate that it is impossible to make a positive diagnosis, because of the possibility of a cure if the pathologic process is not in the pineal gland. Acquired tumors of the adrenals being usually unilateral, it would be perfectly possible to remove one of the adrenals, if it could be determined which one was diseased. It would, of course, be impossible to remove a tumor of the pineal gland.

REFERENCES.

Apert. Annal. de Méd. et Chirurg. Infant., 1911, Vol. XV., p. 115.
Frankl-Hochwart. Deutsche Zeitsch. f. Nervenheilkunde, 1909, Vol. XXXVII., p. 455.
Glynn. Quarterly Journal of Medicine, 1912, Vol. V., p. 157.
Gutzeit. Inaugural Dissertation, Königsberg, 1896. "Ein Teratom der Zirbeldrüse."
Neumann. Monats. f. Psychiat., 1901, Vol. IX., p. 337.
Oestreich u. Slawyk. Virchow's Archives, 1899, Vol. CLVII., p. 475.
Ogle. Transactions Pathological Society of London, 1899, Vol. L., p. 4.
Raymond et Claude. Bull. de l'Acad. de Méd., 1910, Vol. LXIII., p. 265.

Avirulent Tracheal Diphtheria in an Adult.—Beyer (*Berlin. klin. Woch.*, October 28-November 4, 1912) reports a case of a very rare condition. A man aged forty-three, well nourished, admitted for a slight febrile affection with gastric symptoms, was found to have angina, hoarseness and cough. Before a diagnosis had been made he coughed up a membrane containing, among other forms, apparent Klebs-Loeffler bacilli. The patient continued to expel shreds of membrane, containing the same bacilli, but the latter were avirulent in animal experiment. The condition proved to be extremely obstinate, and did not yield to serotherapy or vaccinotherapy. Staphylococcus vaccine was then tested, as this germ was also present, but no benefit resulted, and the author admits that patient was as far from being well as on the day of his admission.—*Medical Record.*

THE EFFECT OF MODERATELY HIGH TEMPERATURE UPON THE INFANT.

BY J. H. MASON KNOX, JR., M.D.,
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It has long been known that the incidence of illness from the intestinal disorders and the mortality rate among infants reach their maximum in hot weather. The number of infant deaths increases from the beginning of hot weather, is greatest at midsummer and rapidly declines as the continuously high temperature lowers toward fall.

The explanation of this phenomenon, perhaps the most striking in the whole subject of infant mortality, is not a simple one, as might appear at first sight. Has the higher summer temperature *per se* a harmful effect upon the baby and, if so, can its influence be lessened? Or does the hot weather injure the infant indirectly? as, for example, through the more rapid decomposition of its food, particularly of its milk?

The untoward effects of high temperature upon the infant have been classified by L. F. Meyer, of Berlin, as follows:—

(1) Immediate. Heat Stroke.
(2) Mediate, including—
    (*a*) A lowering of the baby's tolerance.
    (*b*) A decrease in its immunity against disease.
    (*c*) A less favorable course of alimentary disturbances.
    (*d*) An increased decomposition of its milk.

Whether this classification is finally satisfactory or not it should be a matter of common knowledge that the infant's digestive capacity is lowered in hot weather as, indeed, is that of adults. At this time the baby does not need and cannot take over long periods, a diet of high caloric value. The failure to reduce its food in quality or quantity when the temperature is unduly high, together with the rapid bacterial proliferation in milk in warm weather, probably are important factors in the increased morbidity among bottle-fed babies during the summer months.

The present paper is the result of a study of the temperatures outside (atmospheric) and in the homes of 100 babies in Baltimore, and is offered as an additional indication to the many we already possess, that with only a moderate amount of supervision and with clean milk, the high summer death rate now obtaining among infants may be diminished.

The facts which are, perhaps, of most interest, have been brought together in the accompanying tables.

The babies were in homes visited more or less regularly by nurses of the Maryland Association for Study and Prevention of Infant Mortality. Many of these children had been on our records as prenatal cases and the mothers had been instructed by the nurses before their confinement. No selection of cases was made, except that during the periods of observation one or two very ill babies were sent to the Thomas Wilson Sanitarium.

Accurate maximum and minimum thermometers were left for a period of two weeks in specified houses, usually in the room where the baby slept. These thermometers were read by the nurses, between four and six o'clock each afternoon. At this time the minimum temperature of the previous night was recorded, together with the maximum temperature of the early afternoon. These results were compared with the maximum and minimum outside temperature for the same day obtained from the weather bureau in Baltimore. It is to be regretted for the sake of demonstration that comparatively cool weather prevailed during the fortnights selected for observation.

Age of Babies.

TABLE "A."*

	0-3 mos.	4-6 mos.	6 mos.
Group 1	16	14	12
" 2	15	12	12
" 3	8	2	6
" 4	1	0	2
	40	28	32

The infants were divided in three groups, according to age.

(*a*) From birth to three months.

(*b*) From four to six months.

(*c*) Those older than six months, all were under a year.

The numbers in each group were 40, 28 and 32 respectively. The largest proportion of very young babies is fortunate, as these

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* In the tables, Groups 1, 2, 3 and 4, refer to the following fortnights of observation respectively during the summer of 1912:

Group 1.	July 25th-August 7th	42 cases
2.	August 13th-August 26th	39 "
3.	August 29th-September 11th	16 "
4.	September 12th-September 25th	3 "
	Total	100 "

are known to be most susceptible to all unfavorable circumstances, including high temperature.

Diet.

TABLE "B."

	Breast.	Breast and cow's milk.	Cow's milk.	Proprietary Food.
Group 1	21	13	8	0
" 2	16	16	7	0
" 3	10	5	1	0
" 4	2	0	1	0
	49	34	17	0

Nearly half of our cases were exclusively breast fed, as Table "B" indicates, and one-third additional were partly breast fed, but 17 were exclusively bottle babies. All these received dilutions of scalded or pasteurized cow's milk, prepared in most instances at the homes of the babies under supervision of the nurses.

Proprietary foods were not given to any infants in the series.

Income of Family.

TABLE "C."

	Less than $10 per week.	More than $10 per week.
Group 1	27	15
" 2	26	13
" 3	11	5
" 4	2	1
	66	34

The families have been roughly divided according to total income, thus in two-thirds of the homes the entire wages of the father, or where other members of the family were employed, the entire income of the household was less than $10 a week. This indicates that our investigation had to do with children living in small homes or flats, and in the narrow side streets of the city. It may be added that with a few exceptions all these families were able to pay from 9 cents to 10 cents a day for good milk for their babies, or for the nursing mother.

One case in this connection may be cited.

It was that of a premature baby weighing 3 pounds. The mother's condition was not good, and the breast milk was failing. She was about to wean the tiny infant when found by the nurse. A quart of milk was furnished the mother daily and she was helped in her household duties. Her milk returned and she was able to exclusively nurse her tiny baby through the hot weather and thus save its life amid the most unpromising surroundings.

Legitimate.

Table "D."

	Yes.	No.
Group 1	38	4
" 2	36	3
" 3	15	1
" 4	3	0
	92	8

As indicated, nearly all of our infants were born in wedlock and represent the offspring of the poorer working classes.

Condition of Home.

Table "E."

	Good.	Fair.	Poor.
Group 1	14	12	16
" 2	17	11	11
" 3	5	9	2
" 4	2	0	1
	38	32	30

Condition of the home was designated as "good," "fair" or "poor" by the visiting nurse according to the degree of cleanliness and thrift prevailing. It was not uncommon to find a clean house where there was a small income. The homes represented are about equally divided among these three groups. In a large majority of the houses the nurses were able to secure good ventilation.

Condition of the child at beginning of period.

Table "F."

	Good.	Fair.	Poor.
Group 1	19	8	15
" 2	26	7	6
" 3	8	7	1
" 4	3	0	0
	56	22	22

More than one-half of the babies were in good condition at the beginning of the period of observation; that is, they were of average weight, and were taking and disgesting their food normally. Twenty-two are classified as in "fair" and 22 others as in "poor" condition. The latter groups include those who were below normal, that is, were more or less malnutritic. None of them had perceptible fever or acute diarrhea.

Result during period of observation.

TABLE "G."

	Improved.	No change.	Worse.
Group 1	31	7	4
" 2	31	6	2
" 3	8	8	0
" 4	1	2	0
	—	—	—
	71	23	6

In the case of 71 infants there was definite improvement, as represented particularly by increase in weight and by normal stools during the fortnight of observation. In 23 the condition remained stationary, while in but 4 instances the babies became worse. All of these latter were marantic in type and continued to lose in weight. One died a few days after the completion of the period of observation.

During the first period of July 25th to August 7th there were 113 deaths under one year in Baltimore, and during a second period, between August 13th to August 26th, there were 104 deaths under one year in the city. These figures are, perhaps, a little lower than the average during corresponding periods in previous years.

Temperature.

TABLE "H."

	OUTSIDE.			INSIDE.		
	Aver. Max.	Aver. Min.	Highest.	Aver. Max.	Aver. Min.	Highest.
Group 1	75°	65°	85°	80°	73°	86° (78- 92)
" 2	84°	68°	92°	83°	77°	95° (80-100)
" 3	84°	70°	92°	82°	75°	92° (84-100)
" 4	76°	66°	88°	80°	73°	84° (82- 84)

The averarge maximum and minimum temperatures for outside and inside conditions are indicated. It will be noted that there was no unusually hot weather during any of the time. The outside temperatures were generally lower than those taken in the homes. This is particularly noticeable in the average minimum readings where the average of all readings is more than 7° lower on the outside than on the inside, and is a strong reason for keeping babies out of doors on porches or under trees during very warm nights. The highest outside temperature recorded was 92°F., while in two instances the thermometers in the homes reached 100°F.

Humidity.

TABLE "I."

	Highest.	Lowest.	Average.
Group 1	90%	59%	70%
" 2	82%	60%	70%
" 3	89%	65%	78%
" 4	97%	63%	80%

The percentage of moisture in the air was also recorded, as it is well known that the degree of humidity determines the comfort with which high temperatures are borne. The average percentage of moisture varies at different periods from 70 to 80, the highest being 97 and the lowest at any period 59 per cent.

Summary and Conclusion.

(1) Because of the prevalence of unusually cool midsummer weather these results shed little or no light on the effect of prolonged high temperatures on the well-being of infants.

(2) They do suggest, however, that the babies of the working classes can be kept well during summer heat of moderate intensity if their rights to mother's milk or to pure pasteurized or scalded cow's milk is not denied them, and the mothers needing it received from the nurses in their homes practical instructions on the care, clothing, and diet of their infants.

(3) It follows, therefore, that the large infant mortality prevailing each summer is, to a large extent, unnecessary. This is a potent reason for multiplying the resources of this National Association,* and every other agency whose object is to see to it that the helpless infant receives suitable diet and adequate care.

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* The American Association for Study and Prevention of Infant Mortality.

THE NEED OF PSYCHOLOGIC CLINICS IN CONNECTION WITH THE PUBLIC SCHOOLS.*

BY L. PIERCE CLARK, M.D.,
Neurologist, Randall's Island Hospital.

It is generally recognized that there are two large groups of neuropathic constitutions from which the actual neuroses such as the epilepsies and functional nervous disorders on the one hand, and the psychoneuroses such as the phobias, obsessions and adolescent insanities on the other, are recruited. These are the children with mental deficit and those of the simple neuropathic constitutions. If, therefore, we are to correct the occurrence of the nervous invalidism in later life we must study this material in earliest childhood. How can this be done? Just as nervous invalidism is usually brought out in adults by attempts at adaptation to some new or difficult occupation or environment, so it is with child life. The school work is the child's first important adaptation to competition, to a new world of effort and usefulness in a competitive or emulatory life. The school, therefore, brings the neurotic child under close observation and we should have a mental record of him as well as of all children. The physician should not be obliged to continue to look back upon the early life of the frankly declared cases of insanity in retrospect, to guess at what may have been the school record of the individual during the psychic developmental period. In brief, then, the school is the ideal place for study of the neuropathic constitution of children. Every school system in the large cities ought to have a psychologic clinic for the study of normal and abnormal children.

The establishment of ungraded classes for the subnormal children is of recent growth. Almost in a single decade one has seen the ungraded classes pass from the formation of a class here and there in a whole city's public school system to a complete organization of the work. As some of you know, in New York City alone to-day there are 152 such class schools which care for over 2,700 pupils of the subnormal type. It is now estimated that about 7,000 are in the Greater New York schools. Some more ambitious estimates place the number at double this amount. To meet this demand at least 400 schools of the special type are required.

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* Read before the New York Academy of Medicine, Section on Pediatrics, January 9, 1913.

The general usefulness and importance of the work done in the ungraded classes cannot be successfully gainsaid. The withdrawal of the mentally deficient child from the normal class is alike beneficial for both the normal as well as the subnormal child. Looked at from its broadest aspect, what does this movement really mean, and what bearing has it upon psychologic clinics? This movement was the first great step to differentiate the type of education for children upon their psychic differences. It can well be made an important step in the individualizing of all teaching in public schools. These classes primarily intended for the backward and nervous type have become choked with the obviously unfit material of the idiot and imbecile type. The latter class of pupils are unfit for day school instruction. All recognize that these grossly defective children should be sent to state homes and farm colonies for custodial care and education. And it is the great duty to-day of the State to relieve the schools of this unfit burden. Until provision is made, however, the schools are the proper place for these children, and not the homes.

But now there looms large a more pressing economic problem from a medical, sociologic and pedagogic point of view. That is, the education and training of the neuropathic child. In all probability the master educator who first started the ungraded classes had the neurotic child, and not the subnormal child, in mind, as the latter class had been to a great extent provided for in special institutional schools, while the neurotic child had no such advantage. However, as soon as the special classes were opened they were at once crowded with the defective children. It is only at the present day we are about to restore the ungraded classes to their probable first mission.

It is freely admitted that the pathology and symptoms of many, if not most, nervous diseases are in a fair way of being solved, but their causation is still far from being discovered. This latter statement is doubly applied to the so-called neuroses and psychoneuroses. Any comprehensive study of the etiology of this group of disorders that comprise three-fourths of all nervous diseases must be in their inception in childhood, hence the importance of child study during school age, when the foundation of normal and perverse habits that are being inculcated is at once obvious. As before indicated, the neurotic child group is the embryo storehouse of the adult psychoneuroses and the near-invalidism of later life. All neurologists and psychiatrists should look upon this special field as the most important for analysis and study to-day. All of us know how difficult it is to correct a psychoneurosis in later years, the non-elastic and non-recuperative period of life. So let us study and apply preventive measures when the life material is plastic.

Still more fundamental in such study will be for us to analyze more closely the make-up of the neuropathic constitution, which all are agreed is the essential core of the neuroses and psychoneuroses. It may be just possible when this nucleus, be it the so-called sexual constitution or not, is fully disclosed it will be found to act as a Mendelian unit and thus pave the way for the recognition of psychic factors as well as physical factors in transmissible inheritance.

An intensive research of the family stock from which the neurotic child is recruited will materially aid us in formulating our concepts upon the subject. Therefore, social or field workers in the neurotic child study are absolutely essential; only by such aids shall we be sure that a heredity factor and not an environmental one is at fault. At least after such studies are made it will be possible then for us to measure the degree of causation to each in the formation of psychoneuroses in early childhood.

There can be no doubt that out of the neuropathic constitution, in its broadest conception, flows the neurotic child life *per se,* but here also lie the antisocial traits of the delinquent and criminal type of childhood, such as lying, stealing, truancy, sex perversion and a host of others. It must be recognized that at heart there is little difference between the vicious and delinquent child and the neurotic child. The delinquent boy has the courage of his convictions, for convictions may be bad as well as good, and he projects his habits on others in the family circle or society at large, while the so-called purely neurotic boy is a coward at heart and regresses into infantile habits of depressions, shyness, timidity, excitements, panics, fears and obsessions.

It has been thought that the neurotic child group is a negligible one in point of numbers. I have but to remind you that the same was once thought of the subnormal children, whereas the latest estimate of Goddard shows it to be conservatively 2 per cent. of all school children in New York City schools. I do not hesitate in saying that the numbers of the neurotics are not less and are probably more than the mentally defectives.

What is the sociologic and economic value of this phase of our subject when contrasted to the feeble-minded? A great number of the neurotic children grow up into healthy men and women in later life and become a valuable asset to society, economically and socially, whereas there is little or no productiveness ever to be expected by even the most friendly treatment of the subnormal child. So even from a utilitarian point of view the neurotic child should be given our best study and efforts at correction and prevention of a hopeless invalidism of later life. We must search out by genetic methods a psychologic investigation and classify those neurotic trends in the child personality which are *benign,* as it were, and which point to an after life of comparative health. We shall then be able to view aright the residual characteristics or trend that are *malignant* and that spell the incurable psychoneuroses and precocious dements of later life. The foregoing are but a few of the problems requiring analysis in the neurotic child life. Time forbids an extensive consideration of the many trends of interest we might profitably follow and lay bare in our subject. Suffice it to say that we have no curative remedies to-day to offer. A sufficient and frank study of the nervous child in all his manifestations is not yet at hand. No remedy should be brought forward and applied except as we study and adapt it to the individual case. If it has taken painstaking researches for years, since the time of Sequin and Itard, to make possible a comprehensive training, care and treatment of the subnormal child, the feeble-minded and imbecile class, how much greater must be the time and work required for us to formulate the proper general rules of treatment of the neurotic child, where there is a disordered nervous and psychic life to be set right and not a constant and definite deficit, as in the mental defective. The subnormals may be treated and cared for in groups; they are essentially gregarious and develop best by imitative habits, while the problem of the neurotic child's difficulty is an individual soul problem and must be handled as such.

The foregoing leads us naturally to a pertinent question: What are we going to do about it? Simply this: We must have many psychobiologic clinics for children in this country. This is not a new suggestion. Almost every large city has something of the sort. But I make a special plea for such clinics, to be formed as an integral part of the school system. It is not sufficient that a few rooms and a few physicians be set aside for this work. It cannot be said of this work as it has been said of the specialty of pediatrics, that it is but the practice of general medicine made small to fit small bits of humanity. I submit the work has its special and distinct problems and it is one worthy of the best trained and experienced neurologists and psychiatrists. There should be plenty of able trained social workers, sociologists, pedagogues and physicians in every specialty of medicine to set free the delicate mechanism of the neurotic child from his handicaps in his first great competitive and developmental race in life. Just as we are now entering a new phase of psychiatry, going from the generic and the group study to the special and individual, so it is needful in neurotic child study, not that a lot of cases be loosely studied, but the very few be exhaustively and exactly analyzed; not by external means exclusively, such as taking the height, the weight, and cranial measurements alone, which may make us a class called externalists in study of child life, but we want an intensive study of the inner life, habits and the personality, make-up and its defects, and its defective or substituted reaction in normal trends of mind development.

One of the main reasons for establishing these psychologic clinics in the schools is that the latter have the full confidence of the parents of the school children. The schools are fully equipped and ready for the incorporation of such clinics. Any line of therapeutics laid down for the neurotic child must largely be an educational and training one, and in the diverse multitudinous units of the school system it is easy to supply the special therapy of mind and habit training. Such a clinic should include in its records (1) a definite statement of the specific defects of the abnormal behavior of the pupils in the normal grades and a list of the false adaptations to the standards, (2) a careful research of the family life and environment which may have contributed its share in causation of the child's nervousness, (3) intelligent judgment, will and ethical tests by trained experts, and last, but more important still, a complete psychoanalysis of the inner life of the neurotic child. Then, and not until then, should a mental prescription be given. Provisions for a follow-up record should be provided and a re-examination and review of the cases at certain definite intervals should be made.

A plan such as I have here fragmentarily sketched ought to throw a flood of light upon the budding defects of the educational fruit on the tree of knowledge, alike valuable for normal child development as well as the neurotic child. It will contribute its quota of facts in the changes needed in normal education. This is the day of coöperation no less urgent in any field of endeavor than in our study of the neurotic child. In the psychologic clinic for school children we need team work of trained teachers, the psychologists, the neurologists, the psychiatrists, and the sociologists. The work will reflect credit and honor upon any and all investigators entering upon it.

CHRONIC JAUNDICE AND SPLENOMEGALY.—L. Guthrie (*Proceedings of the Royal Society of Medicine*) reports the case of a girl, aged six years, who eighteen months ago became jaundiced. Icterus has varied in intensity from time to time, but has never disappeared entirely. The urine is sometimes dark in color, but usually pale, and the stools are said to be always dark brown. She often complains of feeling sick, but seems well on the whole. Past illnesses: Varicella and pertussis at three years, "rheumatic fever" at five years, and morbilli at five and one-half years, followed by chorea. Has always been troubled with thread-worms. Family history; Parents, and brother and sister, aged ten and thirteen years, are in good health. No miscarriages. No children have died. Present condition: Fairly well nourished blonde. On admission to hospital, December 11, 1911, the skin, mucous membranes, and conjunctivæ were of bright canary-yellow color. Bowels constipated, motions dark, containing much mucus, but no oxyurides. Urine pale, no bile pigment, acid, 1,015, no albumin. Heart and lungs normal. Liver not felt, area of dullness normal. Spleen easily palpable, extending 2 inches below costal margin. Notch not felt. Blood examination: Serum is colored deep yellow. Reds, 4,190,000; whites, 10,200; hemoglobin, 80 per cent. Differential count: Polymorphonuclears, 76 per cent.; large lymphocytes, 4.5 per cent.; small lymphocytes, 17 per cent.; eosinophiles, 2.5 per cent. During three months' observation the icterus has varied greatly in intensity, but has never quite disappeared. The stools are always dark, and the urine has never contained bile pigment. The spleen is still enlarged. The area of hepatic dullness is normal. The probable diagnosis is: Toxic hepatic cirrhosis with splenomegaly.—*Medical Record.*

THE MENTAL DEFECTIVE AND SOCIETY.

BY WILLIAM LELAND STOWELL, M.D.,
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For the purposes of this paper, the mental defective will be understood to be a feeble-minded person.

The physician first sees the defective when it is one or two years of age, and the family begins to realize that it is not normal, *e.g.*, it fails to grasp objects at six months, fails to show surprise or fear, or begin walking at one year, fails to show curiosity or sociability at a year and a half or to talk at twenty months, continues infantile habits beyond two years, etc.

At six or seven years of age his school teacher notes his limitations; he cannot learn use of objects, appreciate form or color, cannot tell time, or age, or count as normal children do. If his intelligence never gets beyond that of two years he is an idiot; if only to that of seven years he is an imbecile; if he stops at the level of ten or twelve years he is feeble-minded of high grade; if almost up to standard, a moron.

Feeble-mindedness is better described than defined. The feeble-minded child cannot compete with normal children at study or play because he lacks reasoning power, does not appreciate right and wrong or consequences, is actuated by impulse and suggestion rather than design. He lacks imagination, power of initiative or prolonged application. Such persons have little moral sense and are sexually corrupt.

They lack judgment, yet may develop some one faculty to a specialty, as one boy who was, as he said, "ta*lent*'ed" in music.

Number of Feeble-minded.—Data have been gathered of 10,000 persons in California, the same number in New Jersey, also Philadelphia, and extensive studies made in Great Britain, so that we know that a conservative estimate gives one feeble-minded person to 300 normal ones. That means more than 300,000 in the United States—equal to a great city. Suppose all the people in Minneapolis or Washington feeble-minded!

Thirty thousand of these persons are in New York State, and less than 4,000 of them in four proper institutions—26,000 of them are at large in the community. Only twenty-three of our forty-eight states have suitable institutions for feeble-minded at present.

The author's experience has been gained chiefly by eighteen years' service at Randall's Island, where we have now 1,186 aments. We were all aments at birth, and our present standing depends upon both heredity and environment. We try at the Island to supply a proper environment and to teach useful handicrafts or domestic work. The girls learn to sew by hand and machine, to work about the wards and in the flower gardens. The boys work on the grounds, in the tailor shop, shoe shop, make mats and baskets, cane chairs, etc.

Education.—All this work, as well as school-room work, must be under the supervision of normal minds. The child whose brain fails to develop is damaged goods. We cannot supply grey cells where none exist. The condition is incurable. Hence the child should always remain with his peers in an institution. There he will be taught personal cleanliness, if capable of anything, and put through a modified kindergarten course. These simple folks are fond of music and we have a band of twenty-four pieces, with a paid band-master, who drills the boys daily. The gymnasium exercises are conducted with music also. Even imbeciles in the wards learn to enjoy marching to piano music.

Education of the border line cases has been greatly advanced during the last decade. The New York Board of Education has maintained special classes for the defectives, and now has "approximately 150 ungraded classes with a total of 2,200" to 2,700 pupils. Primarily this is a plan that everyone should approve of. The abnormal are separated from the normal and given work suited to their individual needs rather than being taught as classes.

The practical outcome of this fine work is criticised because it seems as though time and space could be used more wisely. For example, an expert can tell by a brief examination that a child is subnormal and should be in an institution all the time, not a public school a short time. In one special class was a cheerful girl of thirteen years by the calendar, but a woman in bulk, happily setting colored blocks in line. This is not work for the public school. Scarcely one-tenth of the children ever rise to the normal grades.

Dr. Helen McMurchy says, "Where special classes have been tried in Great Britain, Europe and the United States, it is found that two-thirds of the children are mentally defective and will always be defective."

Segregation.—All feeble-minded individuals should be segregated in public or private institutions, many because they require physical care, others that they may have instruction by experts; the adults because of the likelihood of their becoming parents of their kind. They are happiest with their own kind, as they cannot compete with normal children in school or normal adults in handicraft or business. Segregation is especially necessary for feeble-minded girls and women because of their lack of moral force. Having no fear of consequences, most of these women become mothers and that very early in life. In 300 families containing mental defectives there were 2,013 children born, 434 of which were defective, and 160 criminal or pauper (Reuben). That is *six children* per family *instead of three,* the average in America now. In *The Feeble-minded World* (Philadelphia Board of Health) is a record of 20 feeble-minded women who bore 60 children by 38 fathers. The English Royal Commission cites a town where 61 feeble-minded women had 158 children, most of them illegitimate. Dr. Fernald, in a recent lecture illustrating types of feeble-minded women, incidentally remarked upon the number of children each had had. The statistics are abundant and experience the same everywhere.

Lombroso contends that prostitutes are the equivalent of criminals. (*The Female Offender,* p. 100.) Making inquiry along this line I found in the experience of the House of Mercy and The Salvation Army Home that one-third of the girls are feeble-minded. Some other Refuges having a higher social grade of women did not recognize more than 4 per cent. or 5 per cent. of feeble-minded. Dr. Catherine Davis, of the State Reformatory at Bedford, in a study of 2,000 prostitutes, decided that 29.2 per cent. were subnormal. (Personal Communication.) In other words, these figures show that feeble-mindedness is two hundred times as common among prostitutes as among normal women of like age.

Anyone desiring to make sure of the heredity feature of feeble-mindedness should read the history of the Jukes family, which had cost this State $1,250,000 thirty years ago, and probably $2,000,000 by this time; or the Tribe of Ishmaelites in Indiana, or "The Kallikak Family," by Goddard, the latter a perfect study of the subject. Proper prophylaxis would prevent such histories being possible.

Our government calmly *takes* the lives of 100 criminals a year, but as yet is slow to *prevent* such lives from beginning.

In this State we happily have one institution at Newark where 800 women are safe from motherhood. There should be several like it.

The ament is always a burden, and it is important to know what it costs to keep him, what to properly teach him, what the prognosis and probable length of life.

Prognosis.—We have already stated that feeble-mindedness is an incurable condition, not a disease. The condition of the higher grades can be greatly improved by training so that they become useful in an institution, though not capable alone. Dr. Caldecot, of Earleswood, investigated "341 patients discharged in fifteen years—3.25 per cent. were earning wages, 3.81 per cent. were at home very useful, 7.5 per cent. were at home and useful, and the rest, 85.5 per cent., were no good and should have been taken care of for life." Observe that these were all discharged cases, supposedly good enough to be out.

We are told by one author that with ordinary care their mortality should not be great, and by another writer that their mortality is nine times as great as the normal death rate. The normal average age at death is now forty-four years, according to Dr. Wiley. Of the 500 deaths studied at Randall's Island the average was thirteen years. (!) Hence normal persons live about three and one-half times as long as aments.

The following table shows the causes of death in groups and compared with the registration area:

Deaths at Randall's Island, 1903-1911.			Registration Area.
Infectious diseases ..	10 per cent.		2.26 per cent.
Nervous diseases ...	10 " "		9.7 " "
Tuberculosis	7.29 " "		10.7 " "
Pneumonia	30 " "		6.7 " "
Circulatory system ..	5.7 " "		12.4 " "
Inanition	23 " "	Congenital debility..	4.0 " "

It will be noted that the percentages of pneumonia and inanition are very high, and that of the vascular system very low as compared with the normal.

Finance of the Defective.—We have in New York State five institutions for feeble-minded and accommodate about 4,000 most of the time. Our other 26,000 are at large all the time. The institutional cost per patient is about $200 a year. We may assume that it is the same in most homes, as they must be fed, clothed and attended by maid or members of the family.

The direct cost of 300,000 defectives is, therefore, $60,000,000 a year in the United States.

In the Elmira Reformatory 37 per cent. of the criminals were found to be feeble-minded—more than one in three. Greater New York's crime bill in 1906 was $35,000,000, and that of the nation $1,075,000,000. Will you charge one-third of these costs to mental defect of the criminals, or to criminal neglect on the part of the public?

Preventive Measures.—Some will ask why any measures other than segregation? The answer is our experience at Randall's Island. From 1903 to 1911 we treated 4,275 patients. Of these, 2,558 were discharged, 847 were transferred to other institutions, and 1,711 were returned to parents or guardians. Of the low grade cases, 35 per cent. were discharged, while of the higher grade feeble-minded, 74 per cent. were discharged. It is among the high grades that danger of reproduction arises, not among the idiots and imbeciles.

Who can reckon the evil potentiality of that 1,700 persons at large?

Sterilization is advocated for criminals and for feeble-minded persons, and the operation therefore has been made legal in Indiana, California, New Jersey, Kansas, Connecticut and New York. Our own act, Chapter 445, Laws of 1912, seems to place emphasis upon the feeble-minded and epileptic rather than the criminal. It not only provides against possible progeny, but considers the physical and mental improvement of the afflicted individual. It is not a punitive, but a prophylactic law.

Sterilization to the general public suggests mutilation and is repugnant. The scientific operation now for prevention of procreation is vasectomy in the male or ligation of the Fallopian tubes in the female. The various methods are open to discussion by surgeons, but need not detain us at this time. When the special sex glands are left in the body their subtle effects upon the character of the person are not lost, but the ability to reproduce is destroyed.

We justly expect families to quarantine their members who have diphtheria or small-pox, and when they cannot, or will not, the city authorities take charge. As families cannot, and will not, segregate their feeble-minded, why should not the State segregate them? As we know, the State is not prepared to segregate one-tenth of those it ought to, why should it not unsex them for public protection?

It should certainly be the law that no person in an institution at public charge, who has been properly adjudged defective, should be discharged therefrom without first being rendered unproductive.

Children are not allowed to marry; why allow these mental immunes to marry? They are only children in experience and intellect, though adults in growth.

Dr. Barr regards asexualization "just as quarantine a simple protection against ill."

Earl Russell in England says, "If the ruling classes in Parliament and in the law were composed of people of adequate medical knowledge, some such remedy as this would become the law of the land."

Such are the views of many students of the subject. Such are the author's views.

160 West 73d Street.

THE SIGNIFICANCE OF CHILDREN'S DISEASES IN INSURANCE.—Grohmann (*Blätter für Vertrauensärzte der Lebensversicherung,* 1912, Vol. III., No. 4) says that no special space is usually allotted to questions about children's diseases in application blanks, yet a history of these diseases is of great importance in judging an applicant. It is necessary to find out the specific affections from which he has suffered, for suspicious findings in the urine gain much in significance if a history of scarlet fever, for instance, has been obtained. On the other hand, partial deafness explained by inflammation of the middle ear in the course of scarlet fever, or scars in the neck following abscesses of lymph nodes during a similar illness in childhood, have much less significance than in case no history of children's diseases has been obtained.—*Medical Record.*

CLINICAL MEMORANDA.

A CASE OF STREPTOCOCCIC ARTHRITIS COMPLICATING LOBAR-PNEUMONIA.*

BY H. LOWENBURG, A.M., M.D.,

Assistant Professor of Infantile Dietetics in the Medico-Chirurgical College of Philadelphia; Pediatrist to Mt. Sinai Hospital; Assistant Pediatrist to the Medico-Chirurgical College and the Philadelphia General Hospital.

C. G., male, aged fourteen months, was admitted to my service at the Mt. Sinai Hospital, November 7, 1912. The chief complaints were loose, green stools, slight fever, dyspnea, cyanosis and restlessness. The family history presents nothing of interest, nor is there anything in the child's previous personal history that bears upon its present condition.

History of Present Illness.—Seven days before admission the mother stated that the child suddenly became ill after an unusually prolonged breast-feeding. According to the mother's statement the patient seemed to be suffering from severe abdominal pain. The child became cyanotic and experienced great difficulty in breathing. Diarrhea with loose, green stools containing curds speedily developed. The patient was irritable and restless. Several physicians saw the baby before its admission to the hospital and each made the diagnosis of pneumonia. On admission the child presented a temperature of 102.2°F., pulse 146 and respiration 36.

Physical Examination.—The head was normal in outline. The fontanels were open; there were no ocular abnormalities noted; the face was normal, except that there was some movement of the alae nasi during respiration. The buccal and faucial cavities appeared normal. Aside from increased action the heart appeared normal. The lungs appeared resonant throughout, except for a small area over the middle lobe of the right lung posteriorly. The breath sounds over this area were harsh; no râles were present. The abdomen and its contents appeared normal. The extremities were well developed and presented no evidences of articular involvement. Kernig's and Babinski's signs were present on both sides. There were no eruptions.

Following admission the temperature rose to 103.2°F., pulse

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* Presented before the Philadelphia Pediatric Society, February 11, 1913.

162 and respirations 66. The child was placed upon breast-feeding. Lumbar puncture was done three days after admission, but gave negative results. Von Pirquet test was negative. The tem-

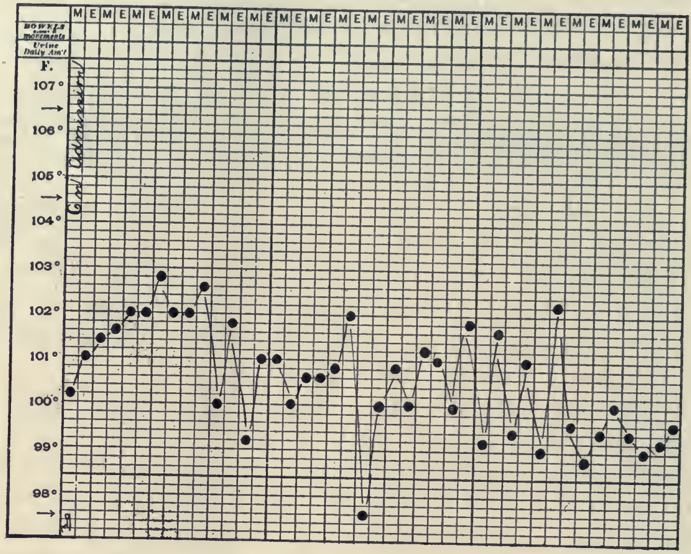

FIG. 1.—Chart of pneumococcic arthritis with general pneumococcic infection.

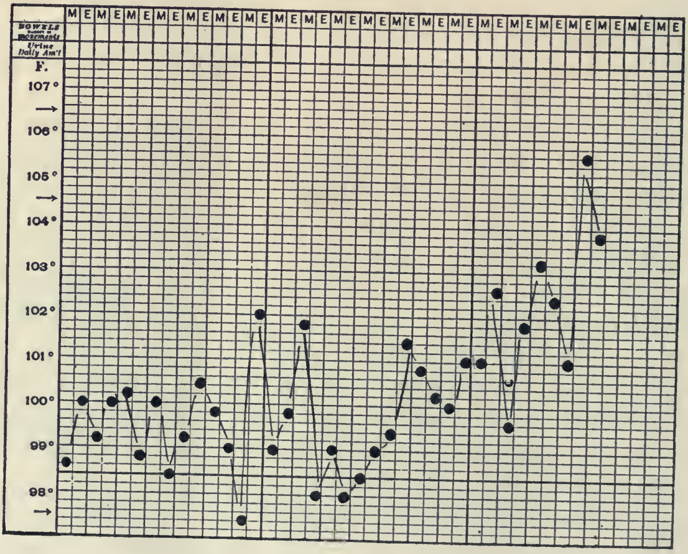

FIG. 2.—Continuation of Fig. 1.

perature remained high until the thirteenth, when there appeared a decided fall to 99°F. From this time on the temperature curve is illustrated by the chart presented. Marked variation, oscillating between subnormal and 103°F. occurred. Daily physical examination failed to reveal any cause for the febrile movement. Blood examination showed:—

White cells	38,000
Polynuclears	80 per cent.
Small mononuclears	19 " "
Large mononuclears	1 " "

Another blood examination showed:—

White cells	29,800
Polynuclears	64 per cent.
Small mononuclears	33 " "
Large mononuclears	3 " "

The urine was negative. On account of the irritability of the child and the apparent positiveness of Kernig's and Babinski's signs another lumbar puncture was made and this, too, proved to be negative.

A slight swelling on the right knee was first noticed by my colleague, Dr. H. B. Shmookler. An X-ray examination showed slight effusion into the right knee. The leg was placed in plaster and the temperature remained normal for twenty-four hours, but later rose again and became septic. Whether the application of the plaster cast had any influence upon the temperature is problematical. Before the swelling of the knee was detected the child was placed upon a mixture of staphylococcic and streptococcic stock vaccine, it receiving in all four or five injections. The first injection was followed by a depression in the temperature, which continued only normal for three days, after which it again became septic, and could not be controlled further by the use of bacterins. After two days the plaster cast was removed, and at this time considerable effusion could be noted in the right knee. An exploratory puncture was made and an examination of the fluid showed the presence of organisms which at first appeared to be pneumococcic and the case was regarded as one of pneumococcic arthritis. Further cultural experiments, however, made by Dr. S. L. Cherry, proved the organism to be a short, thick streptococcus. The knee was incised and drainage instituted by Dr. Brinkman under local anesthesia. The child at this time, however, had been so weakened by the prolonged fever from which it had suffered that it was not benefited by the operation. The temperature rose to 106°F. and the infant succumbed.

A point of interest in this case is the insidious manner in which the knee involvement appeared and also the importance of realizing that a Kernig's sign may depend upon local inflammatory changes in the joints, as well as upon cord involvement.

A CASE OF CHOLECYSTITIS DUE TO INFECTION OF THE GALL BLADDER BY THE TYPHOID BACILLUS IN A CHILD THREE YEARS OLD. CASE REPORT.

BY H. LOWENBURG, A.M., M.D.,

Assistant Professor of Infantile Dietetics in the Medico-Chirurgical College of Philadelphia; Pediatrist to Mt. Sinai Hospital; Assistant Pediatrist to the Medico-Chirurgical College and the Philadelphia General Hospital.

M. Y., male, aged three years, was admitted to my service at the Mt. Sinai Hospital, September 4, 1912. The chief complaints were fever and constipation, which were followed by diarrhea. The family history has no bearing on the present illness.

Present Personal History.—The birth was normal; the eruption of the first tooth occurred at one year; the child began to walk about the same time; had measles at six weeks of age, and pneumonia at one year. Has suffered from frequent colds. Was breast fed for one year. The child on admission showed a temperature of 104.6°F., pulse 140, respirations 48.

History of Present Illness.—Two weeks before admission there was noticed a slight rise in temperature and constipation, but the child did not seem very ill. Four days before admission it suddenly became worse and the fever and constipation increased. On admission to the hospital physical examination revealed a bright, fairly-well nourished child. Following admission it had a very offensive stool containing curds. The head was normal and the fontanel closed. There was no inequality of the pupils and these reacted normally to light and accommodation.

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* Presented before the Philadelphia Pediatric Society, February 11, 1913.

The oral cavity showed no abnormalities, except that the lips were slightly inflamed. The ears were normal. There were no enlarged glands, nor rigidity of the neck. Brudzinski's sign was negative. Examination of the chest revealed a small area of impaired resonance most marked over the right apex posteriorly. Over this area the breath sounds were heard to be somewhat harsher than normal. Aside from the rapidity and some accentuation of the second pulmonary sound, no cardiac abnormality was discoverable. The abdomen was very much distended; liver and spleen were not enlarged; kidneys were not palpable. There were no special points of abdominal tenderness noted. No eruptions were present. Extremities and reflexes were normal. Two days after admission the temperature still oscillated between 101° and 104° F. The child's general condition did not appear as good. Diarrhea was still present. Four days later the Widal test was negative. At the same time a blood examination showed:—

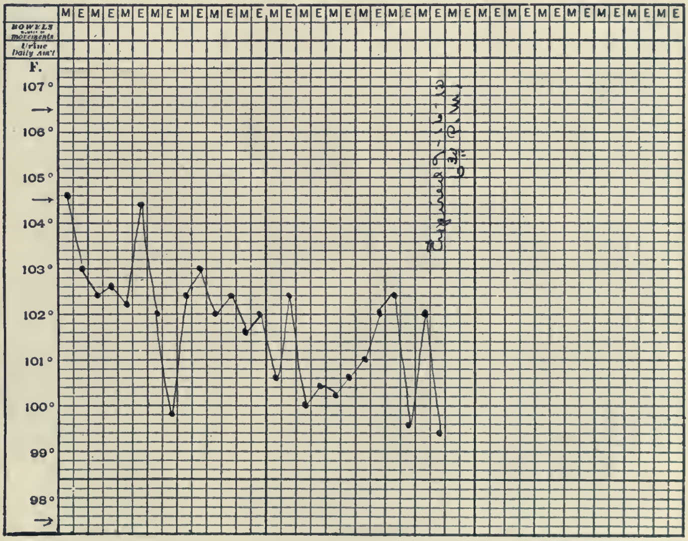

Fig. 1.—Chart of typhoid fever with cholecystitis.

Hemoglobin	60 per cent.
Red cells	3,530,000
Leukocytes	9,800

Differential count:—

Polynuclears	77 per cent.
Small mononuclears	18 " "
Large mononuclears	1 " "
Trans.	3 " "
Eosinophiles	1 " "

The urine showed a trace of albumin, a few granular casts and some amorphous phosphates. September 9th the temperature remained about 102°F, pulse 138, respirations 38. The spleen was found to be palpable, the abdominal distention seemed somewhat lessened, the child appeared toxic. There was a slight suggestion of Kernig's sign and some rigidity of the neck; also some slight inequality of the pupils and a few scattered moist râles were heard over both lungs posteriorly. Lumbar puncture was done and about 40 c.c. of fluid were removed with some in-

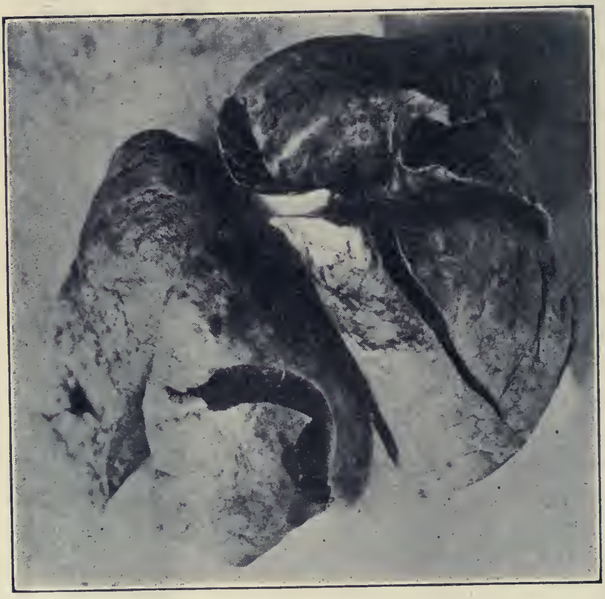

FIG. 2.—Pulmonary infarct in case of primary typhoid infection of gall bladder.

crease of pressure. With nitric acid the cerebrospinal fluid showed slight traces of albumin. By the Noguchi butyric acid test the albumin appeared normal. There was no reducing substance present. Lactic acid was 5 +. Neither cells nor organisms were discovered. September 9th, Widal test still negative. September 11th, child appeared much brighter, pupils were equal and the other signs of nervous irritation seemed to have disappeared. Widal test showed a tendency to agglutination, but still reported negative. September 12th, Widal test positive. A small mass could be palpated on the right side of the abdomen midway between the normal locations of the gall bladder and the appendix. The mass moved with respiration. Many râles were heard over the chest anteriorly and posteriorly. There were present some tetany-like twitches of the arms and the child appeared quite toxic. Constipation was persistent and abdominal distention marked. September 14th, urinary analysis shows nothing of interest and a negative Diazo test. The mass is still palpable over the right side of the abdomen and causes pain on deep palpation. The abdomen was much distended and an enema was discharged without fecal matter.

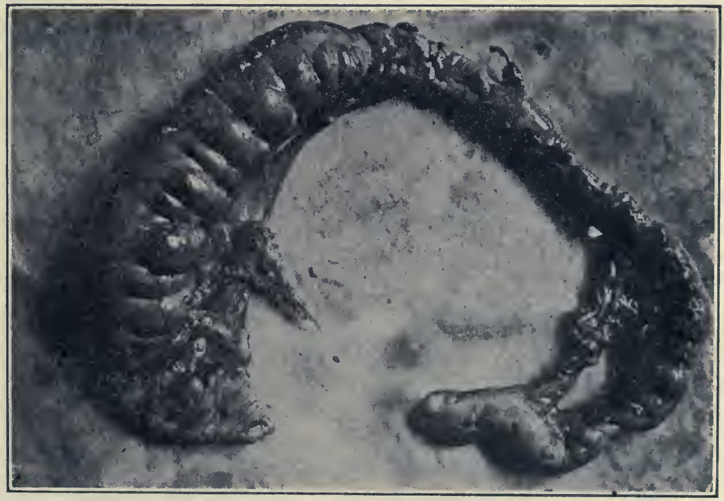

FIG. 3.—Congenital constriction of descending colon and sigmoid found in case of primary typhoid infection of gall bladder. Child, 3 years.

September 14th: Leukocyte count .. 16,800
" 15th: " " .. 17,000

Differential count:—

Polynuclears	88	per cent.
Small mononuclears	11½	" "
Large mononuclears	.5 of 1	" "

Widal test positive. Von Pirquet test negative. The general condition of the child was very poor. Another blood test made on September 16th shows 14,200 white cells, the respirations are shallow and abdominal distention intense, but was relieved somewhat by an enema of subcarbonate of bismuth, charcoal, asafetida and turpentin.

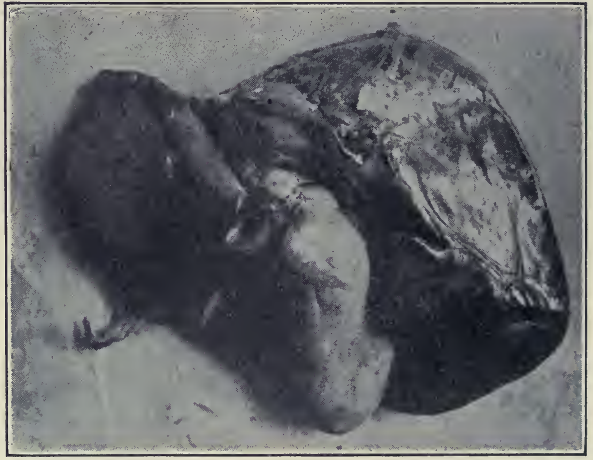

FIG. 4.—Empyema of the gall bladder due to primary typhoid infection. Child, 3 years.

Before the Widal test became positive, the condition was suspected to be typhoid fever on account of the continued fever associated with a comparative leukopenia. The diagnosis was later confirmed by a positive Widal. The appearance of the abdominal mass caused some discussion as to its nature. My own opinion at the time was that it was due to a slight perforation that had become sealed in. This opinion was based upon the sudden appearance of leukocytosis and comparatively sudden fall in temperature from 102⅖°F. to normal and the appearance of symptoms of shock. These, however, were later explained by the postmortem examination, which revealed the presence of an acute and extensive pulmonary infarction in the right lung. My colleague, Dr. Brinkman, saw the case and was of the opinion that the mass was due to a distended gall bladder. The question was argued pro and con, but no definite conclusion could be reached. After the detection of the mass and after the symptoms of shock had somewhat abated, the temperature again rose to 103°F., and assumed a septic type. The child died on September 16th, fourteen days after admission.

Postmortem was performed by Dr. S. L. Cherry, and to him I am indebted for the following notes:—

The gall bladder was distended, and from the contained fluid was obtained a pure culture of the typhoid bacillus. A hemorrhagic infarction of the right lung was also found. The kidneys were the seat of an acute inflammatory condition. The liver was slightly enlarged. The small intestines showed no evidences of ulceration, but there was present marked atresia of the descending colon and sigmoid. The walls of the gall bladder were thickened and covered with a tenacious mucus which contained 100 c.c. of a glairy straw-colored fluid and a few motile bacilli. No bile was demonstrable. The bacillus recovered was Gram negative and motile. In Russell's double sugar medium it produced acid and alkali on the surface. There was no indol. In litmus milk it produced a slight acidity. It was agglutinated by typhoid immune serum 1:800. After absorption for two hours at 37°C. it was agglutinated in 1:60.

The postmortem and pathologic reports show this to be a case of primary typhoid infection of the gall bladder without any apparent involvement of the intestinal mucosa. A point of interest, in view of the fact that no other secondary infection was demonstrated, is the occurrence of leukocytosis comparatively late in the disease. It probably had no bearing on the gall bladder condition and depended upon the pulmonary infarction. The occurrence, however, of a depressed temperature, shock and leukocytosis caused the diagnosis of perforation to be made, which autopsy proved to be wrong.

SOCIETY REPORTS.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Thursday, January 1, 1913.

HENRY DWIGHT CHAPIN, M.D., CHAIRMAN.

THE NEED OF PSYCHOLOGIC CLINICS IN CONNECTION WITH THE PUBLIC SCHOOLS.

DR. L. PIERCE CLARK read this paper. (See p. 197.)

ETIOLOGIC FACTORS IN ATYPICAL CHILDREN.

DR. S. P. GOODHART read this paper. Dr. Goodhart uses the term "atypical" as referring to those children who, because of a disproportion in mental faculties, do not conform to the recognized standard, differentiating between these and those showing essential mental enfeeblement.

Heredity is a dominating etiologic factor. Exalted intellectual power, especially along artistic lines, is frequently found among these atypical beings; though they are usually deficient in practical, or what might be regarded as elementary intellectual quality. There is a lack of proper poise and a want of proper self-control. If improperly educated and brought up in an unsuitable environment, there are developed criminal traits costing the individuals and society the price that ignorance and neglect so often impose.

The mental attitude of these children is too often in conflict with the necessary conditions of life. Eventually, there is developed an incomplete, a weaker personality. Herein lies the seed that may lead to dementia precox.

The redemption of these young beings is of great pedagogic interest, and especial care is necessary during the perilous years of developmental life. Psychoanalysis, as modified by Jung, has emphasized the influence of the incidents and experiences of the earlier years of life upon the later development of a psychoneurosis. The experiences of child life, especially the psychic shocks associated with intense emotion, are forced into the subconscious realm, suppressed and, for the time being, forgotten. Later, these "complexes" form the nucleus around which the neurosis develops.

The transforming of the energy of sexual impulses into productive activity should be urged. There are bi-sexual elements in all children, and the development of the invert is doubtless often due to one profound, or, perhaps, repeated sexual experience, such as seduction, or early masturbatory indulgences among children of the same sex, etc. The will of the child should be especially directed to overcoming obstacles of life experiences. At a critical moment of adult life, the early habits become of immense importance in their bearing upon the course the individual will take. The psychoneuroses of adult life are usually characterized by a return to associative, or primitive methods of thought such as we see in children. This associative, non-productive method of thought should be early transformed in childhood to the direct or productive form that new mental material may be acquired from actual observation and real experiences.

Our regular pedagogic methods are quite at variance with the requirements of the exceptional child, and he should not be measured by the demands of the regular curriculum, or he may be placed among the seriously deficient.

Psychologic clinics are needed with social workers. The clinical staff would study and alleviate mental and moral affections and give pedagogic advice. Thus, the mind of a pre-paranoic might frequently be recognized in time to avert future disaster.

THE MENTAL DEFECTIVE AND SOCIETY.

DR. WILLIAM LELAND STOWELL read this paper. (See p. 203.)

DR. CHARLES A. DANA.—The large percentage of feeble-minded in our population is one of the most important social problems of the day. They are a menace to society, economically costing the State large sums, and socially propagating their own kind and raising an inferior race from a criminal point of view. A certain portion of criminals are formed from this class of feeble-minded. We must look upon the problem from a large point of view, from the point of view of the State, and manage them. The real issue of the problem is going to be the care of the feeble-minded by the State from the beginning of life to its end. There should be a state board for mental defectives just as there is now a State Board of Lunacy, which looks after the care of the mentally insane. This State Board should not be the State Board of Charities. This State Board for Feeble-minded should be laid out on similar lines to the State Board of Lunacy and have definite means of controlling the feeble-minded, obtaining the census and recording the life history of the children from birth to death.

The Board should be supervisor and director. Before school age the children should remain in the care of their parents, but at the same time under the supervision of the Board. At school age they are best educated by the Board of Education and the school department of the State, but still under the control and register of this new Board of the State, and when the case proves to be unfit it should be referred to an institution. After school age the feeble-minded become especially dangerous to society, and it is then usually that they develop criminal traits and become dependent upon the State. It is after the school age that these individuals should be directly taken care of by the State Board for Feeble-minded, and receive care and treatment which will make as many as possible wage-earners and supporters.

A large percentage are not wicked and criminal. During the time we are developing this plan we must help the best we can with the agencies that exist now. The Board of Education and the Department of Charities should help. The ideal is to establish a special department which should control, manage and supervise this class of persons from the beginning of life to its close. That is the opinion of those who have studied this subject here and abroad. The accommodations of the State institutions with proper support should in a short time be 15,000, instead of 3,000-4,000, as is the case at present.

Dr. C. H. Andrews, Buffalo.—My invitation was due to the fact that I am a member of the State Criminal Board of Examiners. I should like to mention a few points along the lines of segregation. We will believe in it. But of what use is it under present laws, which permit the taking of a child from the institution as soon as it is able to do anything? Only those that are dependent can be detained in the institutions. Those who can do a little work can be taken out by a simple request that the parents need their assistance. What is the result? The feeble-minded girls and boys become a prey to those who misuse them. I have in mind the case of a young girl, a seamstress, whose parents wanted her to come home for a visit. We could not detain her and after returning to the institution the girl was found to be pregnant by her own brother. Further, what is the use of increasing the number of institutions if the feeble-minded and criminals increase faster than the institutions? In the state of Washington, sterilization has been declared constitutional. How much will be done in New York State in this respect we cannot say.

Dr. Sachs.—We are still a long distance from an Utopian State, even by the asexualization of the unfit. It will be well to adhere to one or two tangible phases of this discussion. One of these is the phase of the higher defective, namely, the slightly defective. It is surprising, even to the initiated, how great is the number of these slightly defective children. These children are not the proper subjects for the care of the State. They are the victims of unsanitary, unhealthy environment. After studying this question for thirty years I have reached no definite conclusion about it, namely, whether these children are more the result of heredity or of an unhealthy environment. I am inclined to attribute their condition much more to an unhealthy environment than to the remoter factor of heredity.

Before an appeal is made to the State in behalf of these children much should, and can, be done by the friends, families and teachers. The bad environment of a family is the most pernicious factor of this whole question. Mothers will, of course, not admit this. The unhealthy atmosphere and nervous restlessness of home and the father's preoccupation contribute to the development of the defective child.

Years ago I referred to the public school as the only safe regulating influence in our entire American community. The cry against the school that is raised from time to time by the press has no foundation and is all wrong. It is the one force in our community that tends to the prevention of mental deficiency. The school is the safeguard; it is the one force to which we can appeal. I insist upon this point of its wonderful influence and wish to point out to the Board of Education the absolute necessity of regulating and grading the instruction to the requirements of the defective child. The normal child cannot pursue its studies with advantage in the same class with the defective. Putting them together is even a greater injustice to the abnormal child. To place all the defective children in the same class is an error. To help them entire schools must be established for them alone. We advocate an educational system similar to that already existing in the city of New York for the training of a large number of these higher defectives. These children can be trained to become useful members of a community. Proper educational methods can do much. It is the province of the city to undertake this task and the Board of Education should be expected to live up to its duty to train these higher defectives.

DR. MAX G. SCHLAPP.—What are the higher defectives referred to by Dr. Sachs? Evidently feeble-minded children. A large percentage of these children cannot be educated or become useful. The reports that have followed up this aspect of the question, as those of Birmingham, England, have found that a very small percentage are capable of doing any work or becoming self-supporting. This, however, is a small factor. The most serious factor is the relation of these defectives to the welfare of the community. These children are potential criminals and can easily be led into all sorts of conditions which will make them criminal. They are sexually irresponsible and prolific. In the presence of the teacher they will do things that cannot be described. They mislead normal children. The young girls become pregnant and the young boys spread disease. This, in my opinion, is the most important part of the question—the development of the criminal, and most of them are drawn from the class of defectives.

The reports from Prussia, made by teachers, showed that 5 per cent. of the inmates of penal institutions were mentally defective, while reports three years later, made by psychiatrists, showed that in the same institutions 50 per cent. were mentally defective. Dr. Stowell, in his paper, said that this is a condition and not a disease. Does the doctor consider syringomyelia, myxedema, Basedow's, or Addison's, diseases? The same conditions producing these diseases are found to be the cause of feeble-mindedness. We must consider feeble-mindedness as a disease and not a condition. This is a very important and serious question. We must ascertain the cause and therefore the State must segregate these individuals and examine them and prevent prophylactically their increase.

We are just about entering upon a field that will surprise us all. That particular field is that of the use of the internal secretions. Most of the idiopathies are due to a disturbance in internal secretion, and in this line very important work will be done. Syphilis is not the most important factor. The internal secretions are the most important factor in idiopathic cases.

MR. A. B. THORNE, of the Department of Charities.—The most important thing in my opinion is for the State to adopt a definite policy for the care of the feeble-minded. We have a definite policy regulating the activities of the State Board of Charities, admissions, discharges, records, etc. I do not agree with Dr. Dana that a new Board is necessary for the defectives. The Board of Charities has the necessary control. The State must provide the funds and the Board of Charities will erect the buildings, etc.

Scientific investigation should be taken up to find out the underlying cause of the feeble-mindedness. The Board of Charities has already begun this work with a staff of physicians, and these cases will be carefully studied after admission. The tax-payer must be taken into consideration and a new state board would involve extra expense. There is no reason why the city should support the feeble-minded children whose parents are willing to support them. On Randall's Island only those children are admitted whose parents cannot pay for their maintenance.

MISS ELIZABETH FARRELL, of the Department of Education.—The public school is the organization to handle this problem. It is just about one hundred and seven years ago that the public schools were founded and were objected to on the ground that when everybody received an education no one would be left to dig ditches. How we can deny these children the five hours of instruction passes my comprehension! The policy of the Board of Education has been just what was stated to-night. We have said that the feeble-minded must be segregated; we have 2,700 in this city in special classes who are feeble-minded and who need the care of the State. The school is the organization to get these children and use the machinery for sifting them from the normal and transferring them to the care of the State. It should serve this purpose to the community. We are not anxious to get the feeble-minded. In fact, we don't want them. But it is a condition that confronts us and not a theory. Shall we send them to institutions? The parent will not send his child there. We have no law that compels the parent to send it to an institution. We don't want to build custodial homes in the schools. We want to be rid of the whole problem pertaining to the feeble-minded. We want to know that they are in institutions and are working profitably. The education of children must be differentiated. We want the method of individualizing the education of the child. We want to save this wealth of human life to the community.

The doctor cannot tell us very much more than we already know about the nervous constitution of the feeble-minded child. The doctors must help us to have buildings erected and records of these children kept so that they can serve us later on. We must not repeat the mistakes of a century ago. We must make the education of the child democratic. We must have your co-operation for the training of the nervous and atypical child, for unless we save them they will go down.

COMMISSIONER R. W. HUBBARD, Secretary of the State Board of Charities.—The subject of the care of the feeble-minded child is one of the most important that is discussed in this state. Wagner has made a liberal estimate of the mentally defective persons in this state to the number of 400,000. Thirty thousand are idiots, imbeciles and low-grade feeble-minded. The State of New York can never segregate this large number, some of them only slightly defective. The State should aim to take care of low-grade cases, idiots and imbeciles. We want people of this strain to be kept out of this country. We must help Commissioner Williams to keep these feeble-minded from entering this country. I agree with Dr. Dana that the feeble-minded of inherited defective strain are the most dangerous to this country, even more so than the insane. They are much harder to detect and the United States Government should place at the disposal of Commissioner Williams sufficient forces to help detect them. We must also prevent interstate migration. The transportation companies should be forced to return them from whence they came. We need public support that will help the institutions for the feeble-minded and get many private individuals to enlarge the facilities so that larger numbers can be cared for. We need institutions in the western part of this state—at Rochester, Rome, etc. We need an institution for epileptics in this part of the

State. At the Craig Colony 98 per cent. of the epileptics are feeble-minded. When we have these institutions and the forces necessary for detecting and keeping out the feeble-minded we will have made real progress.

A new Board of Control is not necessary. We have voluntary boards serving the various institutions and they are better than paid boards because they do not get into politics. We need a change in our laws so that it will be possible to send persons into institutions and keep them there. We should have means to study these cases before commitment so that they can be accurately measured and sent to the proper institutions.

This meeting should help to secure the laws and means for carrying on this work. One of the institutions is on Randall's Island, but the Board of Estimate has failed to do its duty by that institution. There is insufficient means to employ the right kind of attendants. The attendants at the State institutions are paid twice as much for their services as in the above-named institution. This is one of the shames of the institution. This body assembled here to-night should take this matter up. The schools and charitable institutions should work together and all persons should give their aid.

SUMMARY.

Dr. Clark.—The great majority of the feeble-minded are not potential criminals. We must not use this bugbear for the public. Economic questions hinge about taxation in its various phases. It may be taken more to heart than the potentiality of the criminal feeble-minded. An exact census of the feeble-minded should be made in the State and we should know where they are. There are 6,000 to 7,000 children in homes in this city today that are mentally defective.

Dr. Goodhart.—A large number of the defectives are in their homes and could easily be recognized in schools if proper psychologists were employed.

Dr. Stowell.—The defectives must be placed under proper observation and guidance. I believe with Dr. Schlapp that those "conditions" are diseases. There are 90,000 children on part time now and the Board of Education should make provision for them somewhere and should also have charge of the instruction on Randall's Island. The State ought to provide several times the accommodations that are now present for the mentally defective.

THE PHILADELPHIA PEDIATRIC SOCIETY.

February 11, 1913.

Theodore Le Boutillier, M.D., President.

AN ALBINO FAMILY.

Dr. Frank Crozer Knowles presented a family consisting of seven boys, five of them normal and three of typical albino type. The eldest, third, fifth and seventh boys have blue eyes, are intelligent and normal. The second, fourth and sixth sons have pink eyes and all the associated symptoms of albinism. The parents are Italians, with blue eyes and rosy cheeks, the picture of good health. No cases of this affection could be determined among the antecedents. While two of the albino boys exhibited normal intellect, the third was somewhat of the cretin type. Photophobia and nystagmus were marked in all three boys.

ADRENAL HEMORRHAGE IN THE NEWBORN.

Drs. C. B. Farr and R. A. Glenn (by invitation) showed a specimen of adrenal hemorrhage in a newborn infant into the peritoneal cavity, from the service of Dr. W. R. Nicholson at the Presbyterian Hospital. The baby's mother was a primipara, but labor was not unduly prolonged or abnormal. No instruments were used and there is no record of any fall or injury after birth. At birth the baby had no deformities and weighed 9 pounds, 1¼ ounces. The third day the child was found dead, no symptoms having been noted except a rise in temperature to $99\frac{2}{5}$°F. on the day he died. The body appeared to be that of a healthy, well-developed, well-nourished baby. There was moderate pallor. The cord had not separated but appeared normal. Thoracic organs were normal, except the right lung, which showed congestion at the base. The foramen ovale was patulous and the thymus large. The peritoneal cavity contained a considerable quantity of free clotted blood, confined largely to the right side. About the right kidney was extensive retroperitoneal hemorrhage, bulging forward the peritoneum and separating the layers of the mesocolon. At the most prominent part was a short tear from which the intraperitoneal hemorrhage had come. On section, kidney and adrenal were found surrounded by laminated clots with softer recent clots near the periphery and in the region of the peritoneal tear. The kidney was not involved, but the adrenal seemed to be disintegrated. Microscopic sections showed the cortex well preserved, but the medulla destroyed by the extensive hemorrhage. There were many dark granules, evidently pigment, *as described by Hamill* (ARCHIVES OF PEDIATRICS, February and March, 1901). Hamill collected 90 cases, including his own, while Arnaud (*Archives Générales de Médecine,* 1900, No. 2, p. 5) collected 80. Both of these papers were written and read in 1900. In comparatively few of these was there intraperitoneal hemorrhage. Hamill reports 7 cases in which there was rupture of the sac and extensive hemorrhage into the general peritoneum and refers to several others in which there was slight leakage into the peritoneum. Arnaud found that capsular hemorrhage caused no symptoms in more than half of the cases. In many it was a chance finding; rarely did it give rise to demonstrable abdominal tumors. The remaining cases fell into three categories —those with peritoneal symptoms, those with symptoms suggestive of capsular insufficiency, typical Addison's disease rarely, if ever, developing, and, finally, those with symptoms referable to involvement of the abdominal sympathetic. The latter type Arnaud considers most common. Hamill thought that hemorrhage of this character occurring before or during labor was commonly traumatic; after birth, either before or after separation of the cord, infectious. It is generally conceded that the adrenal vessels are particularly frail and poorly supported. At times the vessel walls may be the seat of local disease in addition. The exciting causes may be various, but fall under the headings of direct trauma and congestion, the latter, as a rule, passive, due to pressure on the larger veins.

DR. S. MCC. HAMILL referred to the case which he had reported to the American Pediatric Society in 1900. Hemorrhage of lesser degree was a very common finding in autopsies among newborn infants, especially in those infants dying of so-called infections of the newborn. There had been, however, but a limited number of cases of rupture into the peritoneal cavity reported up to the time that this case was reported, probably 6 or 8. In his paper Dr. Hamill had laid much emphasis upon the infectious origin of many of these cases, but in the light of more recent investigation it would seem that a larger percentage of these cases are due to other causes than he had been willing to admit. Dr.

Hamill presented the drawing made from the specimen in his case, which was practically identical in appearance with the specimen which Dr. Farr had exhibited.

Dr. J. P. Crozer Griffith recalled a case in which a baby about two days old had died suddenly, and on autopsy the peritoneal cavity was found filled with blood which came from rupture of the suprarenal body. There had been no fever or other evidence of sepsis. The most frequent form of hemorrhage in the newborn, dependent upon trauma or some other unexplained cause, would seem to be intracranial, while the next most frequent is from the suprarenal body. In the hemorrhagic disease of the new-born, the hemorrhage from this body is of an entirely different nature.

Dr. Farr said that there were no evidences of infection in this case, unless the slight rise in temperature is regarded as such. No cultures were taken. The picture in Dr. Hamill's article, as well as the one in Delafield and Prudden's Pathology, represents very accurately the specimen shown.

GASTRIC RETENTION AND INTESTINAL STASIS IN INFANCY.

Dr. Nathaniel Ginsburg presented about 30 bodies of newborn infants, in which the intestines had been dissected out, showing some possible anatomic causes of gastric retention and intestinal stasis. He demonstrated the specimens in detail.

Dr. D. J. Milton Miller, of Atlantic City, N. J., said that he had always believed that, when an abnormally long sigmoid existed at birth, the child later grew up to it and constipation was then relieved. But Dr. Ginsburg's demonstration shows that this may not always occur.

Dr. Griffith said that when pyloric stenosis first came into prominence, many physicians disputed its existence on the ground that at autopsies the pylorus was naturally thickened from agonal contraction. More recently this possibility had been overlooked or disputed. Dr. Ginsburg's interesting observations would appear to raise the question again, at least as it applies to some cases. Some of the cases supposed to be pyloric stenosis may be proved to be a condition secondary to obstruction at the duodenojejunal angle. At least one of the specimens just shown illustrates the possibility of dilatation of the duodenum due to constriction at this point. The administration of bismuth ought to show, in such a case, whether the obstruction was actually at the pylorus. The specimens of elongated sigmoid are of great interest and importance. It has long been maintained that this condition was normal in infancy. It would be of service in this connection if Dr. Ginsburg would give us some percentage figures of the relative frequency of this condition in the newborn and in the adult respectively.

Dr. Harry Lowenburg thought that constipation in infancy was well explained by this demonstration. Many of these conditions must right themselves later, however, as no permanent ill effects are often encountered. He referred to a case under his care in which bismuth injections per rectum showed marked angulation of the sigmoid flexure. This was accompanied by vomiting, which caused the diagnosis of pyloric obstruction to be made. Both vomiting and constipation finally disappeared and the child recovered completely.

Dr. Ginsburg stated that the elongated sigmoid was found in all these infants. It seems possible, when there is no palpable pyloric stenosis, that the obstruction may be at the duodenojejunal angle, since Lane has shown conclusively that angulation does occur at the duodenojejunal junction. Every large sigmoid is not, however, abnormal. In many adults the elongated sigmoid is found persistent.

CHOLECYSTITIS DUE TO PRIMARY INFECTION BY THE TYPHOID BACILLUS.

Dr. Harry Lowenburg reported a case of cholecystitis due to primary infection of the gall bladder by the typhoid bacillus in a boy of three years. The chief complaint was constipation and fever, followed by diarrhea. He had been sick for two weeks before admission to Mt. Sinai Hospital. Death occurred two weeks later.

Dr. Lowenburg also reported a case of streptococcic arthritis complicating lobar pneumonia in a baby of fourteen months. This baby also died. (For the reports of these cases in full see pp. 209 and 212.)

Dr. J. Torrance Rugh called attention to the marked reaction which followed the mixed streptococcic and staphylococcic vaccine and said that, to avoid this, he gives a much smaller dose, never over 10,000,000 for the initial dose, increasing to 25,000,000 later. He believes that the very large doses given account for the poor results obtained by this method of treatment.

CAN TEETHING PRODUCE MORBID SYMPTOMS?

Dr. D. J. Milton Miller, of Atlantic City, read this paper. The fact that primary dentition is often associated with local and constitutional disturbances cannot be disputed. These disturbances are repeated with each incoming tooth so regularly that we cannot escape the inference that the two phenomena are connected. Scientific methods have curtailed the dentition ailments materially. But it should not be forgotten that pregnancy, parturition and the menopause are attended by discomfort and even grave deviations from the normal. There can be no question of pressure, since the teeth have abundant room to emerge, meeting with no resistance from the soft structures above. The symptoms, then, must be attributed to reflex influence and to the conception that the delicate infantile organism reacts in manifest ways to a sensible irritation. May it not be that a tender mouth, deranged digestion and dentition are but expressions of a general hyperesthesia of the alimentary tract due to the great activity of the vital processes during the dentition period? The uniform painlessness of the second dentition may be explained by affirming that the child is now too old to be affected by sensible irritation. Yet coryza may occur with each second tooth, and second dentition may be a contributing cause of chronic intestinal indigestion. Yet in about one-half of all infants observed, symptoms occurring during teething are not to be explained by any other discoverable cause than the teething. Among the local symptoms may be redness, stomatitis, excessive salivation, anorexia, restlessness, sleeplessness and irritability. Fever and disturbances of digestion may occur. Yet we must remember that all diseases in infancy demand prompt treatment, whether the child is teething or not. Lancing the gum often relieves in a surprising way the symptoms of morbid dentition.

Dr. Theodore Le Boutillier said that he had seen two infants in convulsions due to teething in whom the convulsions ceased upon lancing the gum and did not return. In another case diarrhea occurred in spite of correct feeding and seemed to be due to teething only; just as soon as the tooth erupted diarrhea disappeared. Many nervous conditions seemed to be induced by dentition. The correct time for lancing is when the gums are swollen and show a tiny pearly spot. Relief is immediate. He has never had any infection follow. Teething causes many such reflex troubles and lancing is then indicated.

Dr. Griffith's views were of a very positive nature. When a young man he had been given a gum-lancet which he had at first used frequently. He had lost it some time ago and had never felt it necessary to replace it.

Dr. Rugh spoke of cutting wisdom teeth. This natural process is commonly attended by pathologic incidents. Referring to a recent case under his care, he told how the lancet may be needed here also.

Dr. Lowenburg found that he was lancing gums more than formerly. It is wrong to blame anything upon teething except after excluding all other causes by a complete physical and laboratory examination. When no other cause can be found the physician may be justified in making the diagnosis of teething. It is safer to believe that dentition is never pathologic, as the tendency of the general practitioner to regard every diseased state occurring during the teething period as etiologically dependent upon it is too great already and any attitude of compromise emanating from an authoritative source is liable to lead to greater disaster.

Dr. John F. Sinclair has found that dentition may cause symptoms in nervous children. He referred to one child in whom symptoms accompanied the eruption of each tooth, disappearing upon lancing each time.

Dr. Frederick Fraley stated that he had also noted symptoms in children of phlegmatic temperament during dentition. Lancing the gum afforded prompt relief.

Dr. Miller referred to the child mentioned in his paper in whom coryza was noted each time a tooth erupted and disappeared at once when the tooth came through. Local mouth conditions, fever, otalgia and digestive disturbances can easily be due to teething, particularly a form of indigestion in which a baby fails to digest a food it formerly managed well. Despite various modifications the indigestion persists until the tooth emerges, when normal digestive powers return. Dr. Miller has seen this occur repeatedly. Dr. Miller was very sceptical as to teething producing convulsions.

CURRENT LITERATURE.

ABSTRACTS IN THIS NUMBER BY
DR. CHARLES E. FARR. DR. WILLIAM LYON.
DR. S. FELDSTEIN. DR. WILLIAM A. MURPHY.
DR. S. W. THURBER.

DISEASES OF EAR, NOSE AND THROAT.

DENCH, EDWARD BRADFORD: A CONSIDERATION OF BRAIN ABSCESS OF OTITIC ORIGIN, BASED UPON A STUDY OF 21 CASES COMING UNDER THE PERSONAL OBSERVATION OF THE WRITER. (*Annals of Otology, Rhinology and Laryngology,* September, 1912, p. 737.)

Though some of the histories are lacking in detail, the author has made a short abstract of the more important points and among the 21 cases the following occurred in children:—

CASE II. A boy of four years, suffering from a right-sided mastoiditis, for which a simple mastoid operation was done without exposing either the sinus or dura. The patient died four days afterward and autopsy revealed a cerebellar abscess. A small perforation was found in the bone covering the lateral sinus, which was thrombosed, leading into the abscess cavity in the cerebellum. The boy had presented no signs of brain abscess, though the dressing, when changed at the end of the second day, was found saturated with foul pus.

CASE IV. A boy of four years, with a two months' history of left suppurative otitis media. Mastoid opened in the usual manner, neither the dura or sinus being exposed. Five days later, cerebral symptoms having developed, an exploratory operation for cerebellar abscess was performed. The exploration was negative and the boy died of pneumonia twelve days later. A temporo-sphenoidal abscess was found on autopsy.

CASE V. Boy of thirteen years, admitted to hospital in stupor. There was a suppuration of the left middle ear, duration unknown. A large temporo-sphenoidal abscess was found on operation, but the patient died of meningitis seventeen days after the operation.

CASE X. Boy of six years with a history of suppuration of the left ear since infancy. A radical mastoid operation was performed. The patient did well until one month after the operation, when he had an attack of vomiting, sharp fever and headache. A temporo-sphenoidal abscess was found and drained, with complete recovery.

CASE XII. Boy of thirteen years, suffering from an acute exacerbation of a chronic suppuration of the right middle ear. A radical mastoid operation was done and an epidural abscess evacuated over the lateral sinus. The patient did well for two days when he finally developed a cerebellar abscess and died twenty-four hours after the second operation.

CASE XIX. Boy of seven and a half years, who had been operated upon for mastoiditis on November 30, 1910. Two days later, the pulse became slow and the patient comatose. Complete recovery followed a decompression operation, the brain having been explored for abscess with negative results.

On September 2, 1911, the same boy was brought to the hospital unconscious. An abscess of considerable size was found by opening the brain at the site of the decompression operation and the patient made a complete recovery.

From the histories of these cases and those in adults recorded in this article, it was noted that the temporo-sphenoidal abscess occurred more frequently than did the cerebellar type. In all the 21 cases the proportion was 17 to 4. The infection in 9 cases occurred through the tympano-mastoid roof. In 10 cases the cerebral infection followed an acute otitis, and in 7 cases it followed a chronic middle ear suppuration. The most constant symptom was headache; vomiting occurred in some; the mental condition varied from dullness to unconsciousness. Muscular paralysis was present in but two of the whole series. Convulsions were rare. A moderate temperature was the rule, between 100° and 102° F. The blood counts did not give much help. Very little could also be learned from the lumbar puncture made in these cases. However, a correct diagnosis was made in all but 3 of the cases. S. W. THURBER.

PATHOLOGY.

KOLMER, JNO. A.: LEUKOCYTIC "INCLUSION BODIES," WITH SPECIAL REFERENCE TO SCARLET FEVER. (*American Journal of Diseases of Children,* July, 1912.)

Smears from 216 cases of scarlet fever were made and from 50 cases of diphtheria, as well as several of serum sickness, measles, erysipelas and puerperal sepsis. The "bodies" were

found in 94 per cent. of the scarlet cases, 42 per cent. of diphtheria, and in other streptococcic infections. For diagnostic purposes their presence or absence is apparently so relative as to be of little or no value, though some investigators contend otherwise.
WM. A. MURPHY.

SURGERY.

NEFF, FRANK C., M.D.: TREATMENT OF EMPYEMA IN CHILDREN. (*The Medical Times,* October, 1912, p. 291.)

Dr. Neff discusses the great importance of proper general care and emphasizes the importance of early evacuation of the pus, advising puncture or simple incision in young infants and resection in older children if necessary, always using drainage after any type of operation.

Vaccine therapy is mentioned as a more or less valuable adjunct in treatment of intractable cases.

As the mortality is very great in infants any treatment undertaken should entail the least shock possible. WILLIAM LYON.

BRITISH COMMISSION ON FRACTURES: TREATMENT OF SIMPLE FRACTURES. (*British Medical Journal,* London, November, 1912.)

The principal conclusions of the Committee of the British Medical Association on the investigation of fractures are: (1) The statistics relative to the non-operative treatment of fractures of the shafts of the long bones in children, under the age of fifteen years, with the exception of the fracture of both bones of forearm, show a high percentage of good results. The operative results in children are approximately the same as the non-operative. (2) It is possible to obtain a high percentage of good results in children by either operative or non-operative methods. (3) The comparative results of non-operative cases in those over fifteen years of age are not as satisfactory. (4) The older the patient the poorer the functional result. (5) The functional result is much better, age for age, in cases treated by immediate operation. (6) The most certain way to obtain a good functional result is to obtain a good anatomic result.

The Committee also warns that special skill and experience and facilities for aseptic work are necessary for successful results; infection causes a considerable proportion of the failures, that the mortality is so small as to be negligible, and, finally, that operative treatment, to be successful, should not be used as a last resort, but should be applied immediately in cases indicated.

CHARLES E. FARR.

KNOX, J. H. MASON, AND SPRUNT, T. P.: CONGENITAL OBSTRUCTION OF THE POSTERIOR URETHRA. (*American Journal of Diseases of Children,* September, 1912.)

Knox and Sprunt present the case of a boy, five years of age, who had had difficulty from infancy in controlling the act of micturition. Urination was painless, but occurred every half hour day and night. He died of an intercurrent affection, after an illness of four weeks' standing. A dull tumor was noticed above the symphysis, but an attempt at catheterization was unavailing. At autopsy there was found an obstruction in the prostrate portion of the urethra, which was converted into a blind pouch by the fusion of its anterior and posterior walls, due apparently to an over-development of folds normally present immediately distal to the verumontanum. A small triangular opening whose sides measured three millimeters, situated in the floor of this pouch, was the only communication with the anterior urethra, and through this the urine must pass. There was a marked dilatation of bladder with hypertrophy, as also of the ureters and kidney pelves, with typical hydronephresis terminating in uremia. The writers believe that the posterior urethra should be more carefully examined at autopsy to determine whether it is not one of the direct causes of hydronephrosis.

CHARLES E. FARR.

TAYLOR, H. L.: PROGRESSIVE CURVATURE OF THE RADIUS (MADELUNG'S DEFORMITY) CORRECTED BY OSTEOTOMY. (*New York Medical Record,* October 26, 1912.)

Taylor has made a collection of 64 cases of this rare deformity, of which 55 occurred in females. He also reports 3 personal cases. In the typical deformity the hand is displaced forward with marked projection of the ulna backward. The X-ray shows that the radius is bowed with the concavity toward the palmar aspect, carrying the carpus and hand with it; the ulna, however, does not follow but separates from the carpus and projects strongly backward. The shaft of the radius is often bowed externally away from the ulna. The palmar deviation of the radius may be present throughout a large part of the shaft or may be confined to the lower end. The etiology is still obscure. Taylor was able to cure one case by osteotomy. CHARLES E. FARR.

USENER, W.: CANCER IN CHILDREN. (MALIGNE TUMOREN IM KINDESALTER.) (*Deutsch. med. Woch.*, Berlin, November, 1912.)

In two recent years at the Leipsig Children's Hospital, 173 tumors of various kinds were found, of which the most interesting were a round celled sarcoma of the clavicle in a boy of eight, a sarcoma of the right kidney in a girl over four, a sarcoma of the abdominal wall in a girl of thirteen and a sarcoma of the jejunum in a boy of nine. The sarcoma of the abdominal wall seems to be the only case of its kind on record, although Steffen has reported 2 cases, probably congenital, in infants, the tumors being in the subcutaneous fat of the extremities. The jejunal sarcoma, which was also of the round celled type, was apparently cured by excision. The prognosis of such cases is bad on account of the early metastasis. Of the 13 cases reported to date, all but 1 were in boys, 3 only were operated upon, but the one here reported is the only favorable one, and in this case the operation was done for an appendicitis, during the course of which the sarcoma was discovered. All the other cases were inoperable at the time the diagnosis was made, and were quickly followed by metastases.

Sarcoma of the kidney is of great interest in that it generally occurs at such an early age; thus Monti found 44 of his 55 cases under five years of age, and Steffen 194 out of 222. Of the 88 operative cases only 10 had a permanently favorable outcome, the others succumbing to the operation as did the child in Usener's case. CHARLES E. FARR.

FOWLER, RUSSELL S.: FRACTURED PATELLA IN CHILDHOOD. (*American Journal of Surgery*, December 9, 1912, p. 435.)

Fractured patella in childhood is certainly a very rare condition. Fowler's patient, a boy of twelve, received a comminuted fracture of the patella by direct violence, with wide separation of the fragments. After waiting eight days to allow the very pronounced ecchymosis to subside. Fowler operated and sutured the torn aponeurosis both laterally and over the patella with kangaroo tendon. There was one small piece of loose bone and this was entirely removed. The patient was allowed to walk in sixteen days and in twenty-four days the patella was freely movable, with some joint motion. CHARLES E. FARR.

POOL, EUGENE H.: COMPLETE TRANSPOSITION OF VISCERA IN A CASE OF DIFFUSE APPENDICEAL PERITONITIS. (*Annals of Surgery,* December, 1912, p. 940.)

In Pool's case, a boy of fourteen, the diagnosis of diffuse peritonitis was quite evident and the appendix was regarded as the probable cause. The pain had been more severe at first in the left lower quadrant, but later settled in the right lower quadrant. The tenderness was more pronounced in the right lower quadrant, as was also the rigidity. On opening the abdomen through the usual right intermuscular incision, considerable pus escaped under tension, and the intestines were found covered with fibrinous exudate. The appendix was not readily found and the wound was extended into the rectus sheath. The large intestine which presented was identified as sigmoid and, on inspection of the hepatic region, no cecum was found and transposition of the viscera was suspected. Through a second intermuscular incision on the left side the caput coli presented and beneath it a gangrenous appendix, which was perforated. The appendix was removed, both wounds were drained and the patient made a slow but uninterrupted recovery. A careful physical examination and X-ray photographs later demonstrated complete transposition of the thoracic and abdominal viscera. Quoting from the literature, Pool mentioned Sorge's article of 1906 with a list of 194 cases. Six other cases at least have been reported since that time. CHARLES E. FARR.

FLESCH, H.: DUODENAL ULCER IN INFANTS. (ZUR DIAGNOSE UND PATHOGENESE DES DUODENALGESCHWÜRS IM SÄUGLINGSALTER.) (*Jahrb. für Kinderhk.,* Berlin, November, 1912.)

Duodenal ulcer has of late years been found much more frequently than formerly in proportion to gastric ulcer. A considerable number of cases has been reported in infants. At the Budapest Children's Hospital in 1908 Entz found, out of 364 autopsies, 11 cases of duodenal ulcer in children ranging from six weeks to six months. Flesch was able to make the diagnosis in one personal case, which is seldom done during life, from the intense anemia and the bloody stools. The child, whose history is given in full, had been fed at first milk and gruel, and finally the milk had been given up entirely. The inanition and the lack of salts caused by this improper feeding brought about the duodenal ulcer in all probability. CHARLES E. FARR.

EDMUNDS, ARTHUR: ACUTE OBSTRUCTION IN CHILDREN. (*The Practitioner*, October, 1912.)

In addition to the pathologic conditions causing obstruction in adults there are some peculiar to children, especially interesting are congenital malformations. These may be divided into three groups, of which the following example are typical of each group—absence of the greater portion of the intestine, imperforate anus and Meckel's diverticulum.

Symptoms.—(1) Constipation; (2) vomiting; (3) pain, spasmodic, indicated by crying; (4) temperature and pulse at first little affected, but later tend to rise rapidly and is never higher than in adults; (5) facies, pathetic rather than anxious; (6) Tongue, first white coated, but rapidly becoming dry and brown, lips dry and cracked; (7) abdomen, peristalsis sometimes visible, definite areas of distention rarely made out.

Causes.—Tuberculosis in matting intestines to each other or to omentum; congenital malformations due either to error in development or intrauterine disease; cysts of intestinal wall; hernia, true strangulated ones rarely met with in children; foreign bodies obstructing are uncommon; inflammation of appendix and of Meckel's diverticulum and intussusception are not unfrequent causes. Children stand laparotomy poorly, hence rapidity of operating and extraordinary precautions taken to prevent shock. WM. A. MURPHY.

MEDICINE.

HAMBERGER, J.: RIGIDITY OF THE ARTERIES IN CHILDHOOD. (*Münch. med. Woch.*, January, 1912.)

Between the ages of eight and fourteen years unusual size and hardness of arteries has been noted; findings sometimes so pronounced that they suggest arteriosclerosis or kidney disease, but Hamberger ascribes the cause to nervous vasomotor influences. Certain signs of neurasthenia and nervous irritability can be detected in these cases and this exaggerated tonus of the arteries is encountered during years when school life makes special demands on the nervous system. This condition is more common in ambitious and studious children.

WM. A. MURPHY.

STAMM, C.: CONVULSIONS IN THE NEWBORN. (*Archiv. für Kinderhk.*, Vol. LVIII., p. 1.)

Convulsions at this age are seldom functional in nature. This is due to the fact that the irritability of the peripheral nervous system is much less than at a later stage of infancy. Moreover, the nutritional disturbances leading to spasmophilia do not occur at this age, and acute infectious diseases with a convulsive onset are not seen. Yet, despite their infrequency, functional convulsions are occasionally seen in the newborn. The author cites two personal cases. In one case a general convulsion lasting one-half hour occurred after a warm bath. In another, convulsions occurred when cow's milk was added to the breast as a supplemental feeding. As soon as the cow's milk was discontinued the convulsions ceased. Among other causes of functional convulsions are eclampsia or nephritis of the mother and septic diseases, including tetanus.

The author reports in detail the case of a baby born rapidly without instruments that was slightly asphyxiated at birth. The next day general convulsions set in. The infant was comatose, cyanotic and pallid; the lower extremities were spastic, the upper extremities showed intermittent colonic tremor-like convulsions. The head was retracted, opisthotonos was present. There was also convergent strabismus and nystagmus. The anterior fontanel was tense, showing only slight pulsation. The pulse was small and irregular, and the respiration shallow and intermittent. There was no fever. Lumbar puncture yielded 35-40 c.c. of brownish-red serum under high pressure. After the puncture the fontanel became depressed, the convulsions ceased the next day, the infant began to suck and recovered rapidly. This was a case of cerebral hemorrhage occurring without birth traumatism or marked asphyxia. According to Seitz there are three types of subdural hemorrhage at this age—supratentorial, infratentorial and mixed hemorrhages. The characteristics of a supratentorial hemorrhage are marked restlessness, crying, early bulging of the anterior fontanel, and separation of the lambdoid on the side of the hemorrhage. Dermography and unusual pallor of the skin. Facial paresis, preceded by localized convulsive movements, paralysis of the hypoglossus and spinal accessory, spasm and, later, paralysis of an arm and leg are important local symptoms. Lumbar puncture yields slightly bloody fluid, not pure blood.

Infratentorial hemorrhage is shown by the prominence of disturbance of the respiratory center. The anterior fontanel becomes tense at a later stage. There are no pronounced unilateral symptoms. There are symptoms of spinal irritation, opisthotonos, rigidity of neck, spasticity of limbs, bilateral clonic spasms, erection of penis and retraction of scrotum. Lumbar puncture shows abundant admixture of blood.

In progressive supratentorial hemorrhage trephining is indicated. Cushing, of Baltimore, saved 2 out of 4 cases by this procedure. In infratentorial hemorrhage lumbar puncture should be done, thus relieving pressure on the cerebellum and medulla. The outlook, however, in most of these cases is hopeless.

Hemorrhage in the brain substance is usually caused by severe trauma at birth and is readily recognized by the appearance of the cranium. Other less frequent causes of convulsions at this age are syphilis and parasyphilis (hydrocephalus), meningitis, encephalitis and myelitis, purulent meningitis, embolic abscesses, encephalitis, sinus thrombosis and congenital sclerosis and parencephaly. S. FELDSTEIN.

LEITAO, M.: BLOOD PRESSURE IN INFANCY. (*Rio de Janeiro,* 1912.)

Record of 200 healthy children from one year old to five years; 70 per cent. were in first year. Both diastolic and systolic pressures were taken morning and evening by Erlanger and Hooker's sphygnomanometer.

Conclusions.—B. P. is normally low, varying from 62-68 mm. H. 9. in second month to seventh, ranging between 78 and 100 mm. in breast-fed cases; from eighth month to fifth year remains stationary; on the whole showing an upward tendency. Pulse pressure increased progressively, being relatively higher than in adults; second month, 18 mm., seventh was 28 mm., and until five years from 20-34 mm; sex and race had no influence. Artificial or mixed alimentation had a decidedly hypotensive action.

WM. A. MURPHY.

ARCHIVES OF PEDIATRICS

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EDITORIAL.

THE ANGLE OF VIEW.

Like the pinhole, which focusses upon the wall of the darkened chamber the broad panorama of the sunlit world outside in all its wealth of detail and of color, so the science of pediatrics, once considered but a part of general medicine, a small part, "embracing only infant feeding and empyema," really brings within its scope so manifold a group of enterprises that we do not wonder that so few of us manage to keep pace with the progress made in all. In one segment subjects from glass-blowing to woman suffrage come into the field of the pediatrist, and who shall deny that the angle which embraces these two, though it be not the whole field, yet has enough in it to tax the time and resources of the most energetic of us!

If we be what we profess to be, pediatrists, doctors devoting ourselves to the correct growth of children in the unit, how can we help being interested in all that pertains to the correct growth of children in the aggregate? How can we help wishing for the proper moral development to bring about the sturdiest adult citizens? If boys in the glass works of West Virginia work at night in chilly, draughty workrooms, ill clad and in danger of being burned by the hot glass and contaminated by the loose moral fiber of the men with whom they work; if other little boys, of six or eight, sit all day in cramped and deforming attitudes in a coal breaker picking out slate; if little girls work sixteen hours in canning factories; if on the oyster boats in South Carolina and Georgia waters children of the most tender age work at shucking oysters or shrimps until their hands are cut and bleeding from the shells of the oysters or eaten by the corrosive substances in the shrimp which attack even the tin cans; if they get up at dawn and work on empty stomachs, having slept a short night in filth and squalor; if the cotton mills (though Miss Carter says theirs is a benevolent despotism) keep children of school- and play-age indoors and drain what might be a vigorous farming district of its young farmers and farmers' wives; if our feeble-minded girls are allowed to develop unguarded into women in stature and in sexual development but young children in mentality, and thus pass too easily into the ranks of prostitution; if expectant mothers have to work up to confinement and then have to go back to work too soon after the birth of their necessarily inferior babies, have we not, or, perhaps, rather, *should we not have,* in these things quite as vital an interest as we have in rickets, or chondrodystrophy, or scurvy, or tetany, or cretinism? If we can help having it, are we in the full sense of the word pediatrists?

And if woman suffrage shall give an increase of power to those whose care for the child must needs be great and seems likely more quickly to bring help for these and the myriad other hindrances to proper growth that exist, must not, then, every pediatrist be an advocate of woman suffrage?

Not that we mean to dwell on this subject. We are more interested just now, in these days of spring sunshine and budding trees, in admiring the wonderful vitality and energy displayed by the healthy young child whose constant activity and uninterrupted string of questions shows the alertness of his brain. We are interested to see that psychologists regard this condition as the norm and view the slowing up of this pulsating energy as a sign of some abnormality which affects blood pressure, oxygenation of the blood or the nervous energy of the body.

"All work and no play makes Jack a dull boy." Nowadays "there ain't no such animal" as a dull boy if Jack's eyes are right or corrected, if he has an unobstructed nasopharynx and fauces, if he has no anemia producer such as a hookworm or intestinal putrefaction, if he hears well and is not a moron out of place in a graded school. The normal child makes play of work and is active, happy, sweet-tempered, rosy, though not always fat.

We are interested, therefore, in the mechanisms devised for the mental growth as well as the physical of these active, happy, sweet-tempered children, and perennially in the Montessori Method,* upon which we have commented before, and in the schools which are growing more numerous here in America. That the self-educatory methods of the Dottoressa can be made to produce results even in our less placid and non-phonetically-speaking youngsters, we learn almost daily. And while most of us could say with Samuel Johnson, "My master whipped me very hard. Without that, sir, I should have done nothing," and while we find it difficult, indeed, to imagine children in the most sugar-coated of schools little pinks of propriety without any correction, yet we are assured that such is their interest and their desire to use the didactic material that they need none.

Such happy, contented, mentally-active little folk are the kind who will grow into the alert, well-balanced, efficient men and women, the ultimate aim of the medical effort of each one of us. Therefore the attempts to give to every child a healthy body undeformed by labor, and a mind trained to a broader view by schools, which shall instill not mere book-learning, but as well a knowledge of cooking, home-making and trades, are a part of our specialty.

So we are brought into contact with the problem for providing for the dependent parent. The child worker works because the bread-winner cannot get wages that will support him and his children, or because through the accidents of industry the father of the family has been killed or disabled, transformed, perhaps, into a bedridden invalid. For him we must get workman's compensation laws, or pension his widow in order that the child bread-winner shall cease to be!

This is, indeed, the century of the child, and we scientific men, working for the child, must bring within our angle of view all these endeavors if we are to be true pediatrists—and patriots.

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* "A Montessori Mother," by Dorothy Canfield Fisher, pp. 240. 1912. Henry Holt & Co., New York.

"The Montessori Method. Scientific Pedagogy as applied to Child Education in the Children's Houses, with Additions and Revision by the Author." By Maria Montessori. Translated from the Italian by Anne E. George, pp. 377. 1912. Frederick A. Stokes Co., New York.

ORIGINAL COMMUNICATIONS.

INFANT FEEDING AND THE EXAMINATION OF THE STOOLS.

BY FRITZ B. TALBOT, M.D.,

Chief of Children's Medical Department, Massachusetts General Hospital; Visiting Physician to the Boston Floating Hospital.

The problems of infant feeding have been studied from many points of view and many excellent investigations have added to the accuracy of our observations. The weight chart, the temperature chart, the appearance of the baby, the clinical symptoms, the caloric requirements, and percentage feedings have all had their exponents, and more recently attention has been drawn to the stools.

The writer uses the combination of *all* the above methods in feeding the babies that come under his care; sometimes more stress is laid on the energy requirements, at other times on the symptoms and weight chart, and at other times on the stools. Sometimes the stool findings are not acted upon when they do not agree with the clinical symptoms.

The examination of the stool in diseases of the digestive system is as important as the examination of the urine in the diseases of the kidney, but one cannot treat a disturbance of digestion by only examining the stools any more than one can treat uremia according to the urinary findings. (Hecht.) It does, nevertheless, give important information which frequently determines the whole course of treatment.

There are three methods of examining the stools: (1) Macroscopic, (2) microscopic, (3) chemical. The first should be used by all physicians. The second requires knowledge of the microscope and usually only confirms what is seen in the gross, yet occasionally it gives very astonishing and important information and for that reason should not be omitted. Most of the chemical tests are too complicated for practical use and are only of value to the laboratory investigator.

The Macroscopic Examination of the Stools.—The excellent article by Dr. John Lovett Morse, "The Stools in Infancy" (*New Orleans Medical and Surgical Journal,* April, 1910, Vol. LXV.), gives a detailed description of the gross appearance of the normal and abnormal stools of infancy. It should be consulted by those who are not familiar with the different types.

The microscopic or microchemical examination of the stools depends upon the staining properties of the different forms of fat and of starch.

Fat.—The majority of the fat in cow's milk is in the form of neutral fat. When it is ingested, a small part is split by the gastric lipase into fatty acids. All of the fat is passed on into the duodenum, where it mixes with bile and steapsin, and is split into fatty acids. These combine with the sodium carbonate of the pancreatic juice to form soaps. The amount and character of fat in the stool, as shown by the microscope, gives a very good idea of the processes of digestion. The effect of bacteria and the salts upon the digestion of fat will not be discussed in this paper.

Microscopic Examination.—The technique of the examination of the stools is as follows: Place two small bits of fresh stool (about the size of one-half a grain of rice) on a glass slide. Stain one with a saturated alcoholic solution of Sudan III. (this solution is best made with Sudan III. powder and 95 per cent. alcohol) and the other with a solution of Carbolfuchsin (that used for staining tubercle bacilli stains too deeply and should be diluted about one to three with water, so that the degree of color can be distinguished). The following table shows the difference in the staining properties of neutral fat, fatty acids and soaps.

STAIN	NEUTRAL FAT	FATTY ACIDS	SOAPS
Sudan III.	Drops staining orange red	Drops staining red, or crystals staining orange red	Crystals do not stain
Diluted Carbolfuchsin	Drops do not stain	Drops and crystals stain brilliant red	Crystals stain dull red

The fecal material and stain is covered with a cover-glass, mixed and examined with a low-power objective. The Sudan III. slide should be examined first. The table shows that neutral fat and fatty acids may both be in the form of droplets; it is, therefore, impossible to differentiate between the two by this stain alone, and if fat drops are present the other slide should be examined. If the drops are neutral fat, they will not stain with Carbolfuchsin, while if they are fatty acids they will stain a brilliant red, the intensity of the stain depending upon the amount of acid they contain; the more acid the deeper they stain. Soaps do not stain with Sudan III.; they stain dull red with Carbolfuchsin, but it is practically impossible to tell the difference between soap crystals and dead bacteria. This stain, therefore, cannot be used to estimate the amount of soaps. The amount of soap should be estimated as follows: Note is made of the amount of fat stained by Sudan III. in the first slide; a drop of glacial acetic acid is then allowed to run under the cover-glass and is mixed with the feces by lifting one side of the cover-glass and replacing it; the mixture is then gently warmed until it commences to bubble (it should not boil because this will make the fat run off the slide) and examined quickly while it is warm. The increased number of fat drops represent soaps (the soaps have been changed back into fatty acids by the glacial acetic acid and are stained in this form). The final acidified warm slide shows the total amount of fat in the specimen; it should always be examined while it is warm, because on cooling many crystals appear, which present a picture in which it is impossible to estimate the amount of fat present. Mental note should also be made of the amount of fat in relation to the amount of unchanged fecal material. This gives an idea of how much fecal material is fat and how much represents bacteria. Particles of stool should be examined in the above manner from different parts of the specimen in order to obtain an average picture. The microscopic examination is simple and requires but little time.

Information obtained from the microscope is often only confirmatory. The younger the baby the more microscopic fat can be in the stool without being of clinical significance. One should, therefore, not be misled because fat drops are seen in large numbers in the stools of very young infants. Conversely the nearer the baby gets to childhood the more important are the microscopic findings. *In all instances they should be only acted upon when they are associated with clinical symptoms.*

Carbohydrates.—The digestion of carbohydrates may be summarized as follows: Starches and sugars are split by the amyloytic ferments of the saliva, pancreas and small intestine into their simplest form, the monosaccharide. They are then absorbed directly into the blood (principally as dextrose), either ready for use or to be stored up in the liver in the form of glycogen. The following table shows graphically the stages through which they pass.

Milk sugar group	Cane sugar group	Malt sugar group	
		Starch (Amylum)	
		Dextrin (Amylo-dextrin)	**Poly-saccharide**
		Erythro-& Achro-dextrin	
		↕	
Lactose (Milk sugar)	**Saccharose (Cane Sugar)**	**Maltose (Malt sugar)**	**Di-saccharide**
↕	↕	↕	
Dextrose+Galactose	**Dextrose+levulose**	**Dextrose+Dextrose**	**Mono-saccharide**

Starch is stained blue by iodin. A satisfactory reagent is Gram's solution; this should not be too strong; if so, it should be diluted with water until the starch granules stain a definite blue or violet color. If these colors cannot be distinguished starch is not present. Partially digested starch (erythrodextrin) takes a reddish stain. Sugar cannot be stained and rarely appears in stools. When fermentation is carried beyond the monosaccharides the sugars are broken down into lactic, acetic or succinic acids, which give an intensely acid reaction to blue litmus paper and scald the baby's buttocks. When Gram's stain is added to the stool large amounts of starch may be seen in the gross, while smaller amounts can be detected under the microscope. There should be no microscopic starch granules when the digestion is normal. In this connection, it should be remembered that most baby powders contain starch. When bacterial fermentation is added to the disturbance of digestion of either starch or sugar the stools are loose and green, and may be frothy or feathery.

Protein.—There is no satisfactory microscopic or microchemical test for either casein or lactalbumin. We have, therefore, to depend upon the gross examination of the stools and the presence of tough casein curds. It is impossible to say whether lactalbumin does harm or not.

The Application of Stool Findings to Infant Feeding.—In the majority of instances the microscope does not give any information concerning the stools of infants that the gross examination does not give to the skilled observer. It is, however, very valuable confirmatory evidence and makes the gross examination the more accurate. Frequently it gives negative evidence which is as valuable as positive evidence. For example, a case of constipation may be due to too little fat or to an excess of fat. The microscope quickly tells whether the fat is at fault or whether more fat may be given.

The following table is a synopsis of the stool findings as applied to infant feeding:—

SYMPTOMS OF INDIGESTION	DUE TO	SHOWN BY VOMITUS AND STOOLS
Vomiting Regurgitation Gas in stomach with or without discomfort Failure to gain or loss of weight on food containing sufficient calories Gas in Bowels Colic Loss of Appetite Fever or subnormal temperature Poor appetite Frequent or undigested stools	FAT	(a) Creamy vomitus (b) Stools containing (1) Soft curds (2) Soap stools a. Clay-like b. dry, crumbling (3) Oily stool, color of Indian meal
	CARBOHYDRATE	(a) Watery, sour vomitus (acid) (b) Stools (1) Acid, scalding (2) Feathery, bubbly (3) Starch stains blue with Gram's solution
	PROTEIN	(a) Cheesy vomitus (b) Stools containing tough curds

Physical examination must rule out disease in other parts of the body and the milk must be absolutely clean. Infections of the gastrointestinal canal are not considered in this classification. The writer believes, however, that the normal saphrophytic bacteria plays some rôle in the processes of digestion, but will not discuss this complicated phase of the subject, since it is not certain just how far the quality of the food influences their growth, and just how much they influence the digestion.

The symptoms of indigestion may be practically the same in fat, sugar or casein indigestion, and it is, therefore, obvious that the symptoms alone do not tell what is the cause of the indigestion. The necessary information must be obtained from what can be seen, *i.e.*, from the vomitus and the stools.

The information obtained from inspection of the vomitus is not very accurate and is frequently only confirmatory. Creamy vomitus, in absence of other data, suggests too much fat in the food; watery acid vomitus, too much sugar, and cheesy vomitus, too much casein. These characteristics usually are confirmed by the stool findings.

The stools give the most accurate data, but attention should not be focussed on them to the exclusion of other factors which may be equally important. Stools which apparently are not perfectly digested should not be a reason for changing the formula of a baby that has no symptoms of indigestion and is thriving and happy—for example, a breast-fed baby. It would be unwise to diminish the food of any baby unless it had some of the symptoms enumerated in the table.

When these symptoms are present the stools usually tell what is the cause of the symptoms and the formula should be regulated accordingly. *A fat indigestion* is usually shown by soft curds in the stools, occasionally by soap stools, and rarely by oily stools. The writer's experience has been that when oily stools are found the baby is in a serious condition and usually cannot be saved without breast milk.

CASE I. Baby C., aged four months, weighed 7 pounds at birth and was always bottle-fed. She had not gained weight in the past three weeks, the present weight being 11 pounds. For the past three weeks she had colic, frequent undigested stools, from three to five a day, which had not scalded the buttocks. The formula was fat, 4 per cent.; lactose, 6 per cent., and protein 1 per cent., 32 ounces in the twenty-four hours, giving 120 calories per kilogram of body weight. Physical examination showed a baby normal in every way except that she was a little pale. The stool contained many soft curds surrounded by mucus. The microscope showed that these curds were composed entirely of fat in the form of soaps. This meant an indigestion due to fat. The formula was changed to: Fat, 2 per cent.; lactose, 6 per cent.; protein, 1.6 per cent., 32 ounces in twenty-four hours. The colic stopped in forty-eight hours and the baby began to gain satisfactorily.

A *carbohydrate indigestion* is practically always accompanied by scalding stools. It usually is cured by diminishing the amount of sugar in the formula or by leaving out the starch.

CASE II. Baby H., aged five months, weighed 6½ pounds at birth and did perfectly well up to one month ago when it had to be weaned suddenly from the breast. For the past month he has gained a few ounces and then lost. Has spit up sour watery material and has had considerable colic and gas in both the stomach and bowels. It was found that the mother had added an extra tablespoon of milk sugar to the formula of her own accord, "to make the baby gain." The formula figured: Fat, 3 per cent.; sugar, 7.5 per cent., and protein, 1.70 per cent., 36 ounces in twenty-four hours. Physical examination showed a perfectly normal baby with considerable gas rumbling in its bowels and a badly scalded buttock. The mother said: "Oh, yes, that came after I added the extra sugar." The stool brought for examination was brownish-green, watery and very acid to litmus paper. There was very little fecal material to examine, but a small bit did not show an excess of fat. The formula was changed to: Fat, 3 per cent.; sugar, 5 per cent., and protein, 1.70 per cent., 36 ounces in twenty-four hours, after which the stools stopped burning and the baby was happy and gained.

In more serious and persistent cases it may be necessary to use milk mixtures containing high percentages of protein either in an ordinary modification or in the form of precipitated casein. Occasionally such indigestions may be cured by boiling the milk sugar before it is added to the mixture, and in other instances other forms of sugar, such as maltose or cane sugar, may be used. Buttermilk probably has the same chemical effect as precipated casein because of the finely divided particles of casein, except in gas bacillus infections, in which it is specific.

The casein or tough curds in the stools are evidence of *protein indigestion* when they accompany any of the symptoms given in the table. In these cases the amount of casein should be either diminished or the quality changed by boiling so that the curd will be fine and flocculent, or modified in some of the other ways familiar to pediatricians.

CASE III. Baby W., aged two months, weighed 6 pounds at birth. His digestion had never been good and he had not gained more than 4 ounces in any week. He had a poor appetite and was often distressed, and passed two to three stools a day, many of which contained tough curds. These curds were not prominent features in the stools until eight days ago, when some appeared in each stool and the baby had lost ½ pound. The formula contained: Fat, 2.70 per cent.; sugar, 6 per cent.; protein, 2.20 per cent. (that is, it was about two-thirds whole milk and one-third water, with some sugar added). The trouble was evidently due to too much casein. The formula was, therefore, changed to: Fat, 3 per cent.; sugar, 6 per cent., and protein, 1.20 per cent., the total quantity remaining the same in twenty-four hours. At the end of one week the baby began to gain. The symptoms of indigestion stopped, and there were no more casein curds.

Mixed forms of indigestion are accompanied by mixed forms of stools, and it is often difficult to know how to modify the formula in these cases. A careful history, however, will usually show that there has been prolonged over-feeding of one of the food components, which will probably be found to be the primary cause of the trouble.

These mixed types are more chronic and persistent than the simple types described above, and, as a result, repair comes more slowly, even with the best of treatment. In some instances the indigestion of one food component reacts so upon another that there is danger of being led astray. But as one becomes more and more familiar with the simple forms, the complicated forms are more easily understood. In many instances so much damage has been done that breast milk must be given to save the baby.

Very little has been said in this paper about over-feeding. Overfeeding may be defined as giving too much of any separate food component or of all the food components combined. When a single food component is given in excessive amounts, the baby may be getting exactly the required number of calories, but when there is "gross over-feeding" there are always too many calories in the food. The former can be remedied by studying the stools and modifying the food according to the stool findings, while the latter may be cured by giving less food.

The principles and the table described above apply to every problem of digestion in which infection does not play a part. They make the regulation of feeding simple and definite instead of blind and experimental. The caloric requirements of each baby should be supplied by the food components it can digest. The amounts of the individual food components should be regulated according to the stool findings.

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BOILED AND RAW MILK.—J. Brenneman (*Journal of American Medical Association,* February 22, 1913) notes that raw milk and boiled milk are clinically very different foods; that the most striking difference between them as shown experimentally is in their reaction to rennin; that the casein of raw milk, unless modified so that it will not form hard and large coagula, offers serious difficulties in digestion that are not present in boiled milk; and, lastly, that these differences between raw and boiled milk should always be borne in mind in comparing clinical, therapeutic, and experimental results in infant-feeding.—*Medical Record.*

HEMORRHAGIC CONDITIONS IN CHILDREN—PATHOLOGY—ETIOLOGY—TREATMENT.*

BY A. L. SORESI, M.D.,
New York City.

Hemorrhagic diseases of the newborn (melena neonatorum, spontaneous hemorrhages in cavities and under the skin), hemophlia, scorbutus, purpura, are pathologic conditions grouped together under the name of hemorrhagic diseases of children. As there has been, and still is, much confusion about the pathology and etiology of hemorrhagic conditions, which are little known, it would be better to refer to them as to pathologic conditions due to a hemorrhagic diathesis. Although hemorrhagic diathesis does not explain anything, at least it indicates the characteristic of these conditions, *pathological hemorrhage.*

Hemorrhage per se is not considered and is not pathologic; if tissues are cut, contused or lacerated, if the continuity of blood vessels is interrupted, if the atmospheric pressure is increased or decreased beyond certain limits, we expect hemorrhage more or less severe, according to the injury and we do not talk of pathologic hemorrhage. We do not think of hemorrhagic disease in the bleeding following childbirth, in hemoptysis, in menstruations, in ulcers of the stomach and intestines, and in so many other cases, although the hemorrhage can be so severe and persistent as to be fatal. *If hemorrhage is the principal symptom of hemorrhagic conditions, and not every hemorrhage constitutes hemorrhagic disease, it means that there is something peculiar about the bleeding occurring in this class of pathologic manifestation. The peculiarity is, that hemorrhage occurs, to all appearances, spontaneously in some cases, in others for reasons which would not cause hemorrhage in normal children; and that there is no tendency of the blood to coagulate.* To understand as well as possible, at the present time, the etiology and pathology of hemorrhagic conditions it is necessary to recall two fundamental laws governing the circulation of the blood. *The blood flows freely and directly from the arteries into the veins through the capillaries without oozing into the tissues or into cavities;*

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* Read before the Section on Pediatrics of the New York Academy of Medicine, February 13, 1913.

whenever bleeding occurs there is an immediate tendency of the blood to coagulate.

According to these laws hemorrhagic diseases must be divided into two classes—in one we must include the conditions in which the blood oozes out of the capillaries for causes which in normal conditions would not provoke any oozing, such as hemorrhagic diseases of the newborn, purpura and scorbutus; in the other we must put that condition, *in which the hemorrhage occurs, as in normal conditions,* such as after tearing or cutting blood vessels, *with the difference* that in normal conditions the bleeding stops almost immediately, while in the pathologic conditions there *is persistent bleeding;* this occurs in hemophilia. *In conditions of both classes the hemorrhage has no tendency to stop.* This distinction of hemorrhagic conditions into two classes must be well understood and appreciated, because even at the present time many writers confuse the different pathologic conditions and refer as the pathologic basis always to lack of coagulation, without valuing the fact that in the first class there are two phenomena to be taken into consideration: *one is, that the blood oozes out of the capillaries without any appreciable reason, the other that the blood has no tendency to coagulate; while in hemophilia there is no hemorrhage, unless there has been a discontinuity of some blood vessels, which discontinuity would have caused bleeding also in normal individuals.* A hemophiliac can live many years without even suspecting his pathologic condition, until the pulling of a tooth, a slight cut, a light blow on the nose or similar trivial factor, causes a persistent

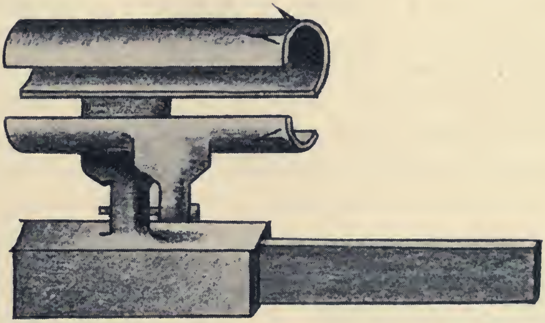

FIG. 1.—Showing apparatus opened to allow blood vessel to be inserted before being cut.

hemorrhage, which cannot be stopped with ordinary means and may even be fatal. Confusion is helped by the reports of cases, such as the well-known one reported by Wunderlich. This author observed a boy whose body showed hemorrhage in spots, where he had been occasionally whipped, even lightly, by his teacher. Later on Wunderlich found that the boy was suffering from hemophilia. The easy conclusion was, that the child showed those hemorrhagic spots because affected by hemophilia. The truth is, that hemorrhage was caused by traumata, the intensity of which does not cause hemorrhage in normal children, but if their intensity should be increased would cause hemorrhage also in normal ones; while hemophilia is characterized by the fact that a hemorrhage which is considered slight in the normal individual is severe in people suffering from hemophilia, *only because, although not profuse, it cannot be stopped,* and always occurs after a trauma which would cause hemorrhage also in normal individuals. So in studying the etiology and pathology of these conditions we have to find out, in the first class, *why the blood oozes out of the capillaries; in both classes, why hemorrhage does not stop.* Few authors are inclined to admit that the cause of hemorrhage is to be found in the small blood vessels; the majority attribute it only to changes in the blood. It is impossible to prove that the capillaries are at fault, and as the blood can be examined while the capillaries cannot be, and something is found wrong with it, it is easy to state that the cause of hemorrhage is to be looked for in changes of the blood. The best and seemingly very strong argument offered in favor of this theory is that injections of normal serum or blood stop bleeding; how this happens will be discussed in the treatment; suffice to say now that bleeding stops at times spontaneously to show the weakness of the argument. Indeed, mild cases of hemorrhage of the newborn are cured without any treatment whatsoever; in these cases there *has been hemorrhage without any appreciable reason, which constitutes a pathologic condition, but bleeding stopped spontaneously.* This spontaneous stopping shows that the blood contained the normal elements which favor coagulation, therefore showing that the blood was acting as in normal conditions in order to prevent further hemorrhage. Other facts to be taken into consideration: Circumcision has been done a few days after the cessation of hemorrhages without causing any abnormal bleeding; these hemorrhages cannot be attributed to trauma, but bleeding is frequently observed and extremely liable to occur in the skin over pressure points and in mucous membranes that are the seat of pathologic processes, eyes, nose, genitals. Can these cases be explained by admitting only changes in the blood? It seems more reasonable to think that these spontaneous hemorrhages are caused by some fault in the capillaries alone, when the bleeding stops, as it would in normal conditions, spontaneously; that when the hemorrhage continues unless stopped by therapeutic means there is an association of some kind of lesion of the capillaries and abnormal constitution of the blood. What the lesion of the capillaries is it is difficult to prove, but it is certain that the capillaries of infants are more delicate and fragile than the capillaries of adults, and that all hemorrhagic diseases are more frequent in childhood than in adult life, and in cases of hemorrhage of the newborn the bleeding occurs only in the very first day of extra-uterine life, and never occurs after. The mesh constituting the capillaries is very delicate and fragile; the continuous friction of the passage of the morphologic elements of the blood, under changes of temperature, pressure, etc., might break it and cause an extravasation of blood in the tissues or in cavities. It might also be that the tonicity of the capillaries is lowered by the presence in the blood of some pathologic active elements, or by the lack of some active normal elements present in the normal blood, and that even under normal pressure they give way and let the blood flow out.

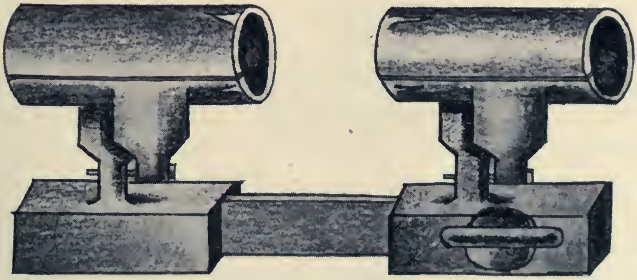

FIG. 2.—Showing both halves of apparatus closed and provision for approximating the two sections.

Why the blood does not coagulate when leaving the blood vessels, as it occurs in normal individuals, will not be explained until the normal process of blood coagulation is thoroughly understood. When this process is known it will be possible to establish when and where there is absence or diminution of some essential elements or the presence of abnormal elements which in some way have to do with the coagulation of the blood. But even the knowledge of the laws regulating coagulation of the blood *per se* will not explain all the causes of persistent bleeding, because at times there is formation of blood clot, but the coagulum does not prevent further hemorrhage. The condition might depend on a double factor—the coagulum is not tough enough to seal completely the ends of the torn or cut blood vessels, or the broken ends lack tonicity and do not help, on account of lack of contraction, their tightening around the thrombus, so that bleeding continues between the blood clot and the broken ends. To understand well how hemorrhage stops, we have to take into consideration two factors—the blood and the blood vessels.

The blood must coagulate. Coagulation occurs when the elements of the blood are imprisoned in a fibrinous mesh; the fibrin which constitutes this mesh is derived from the fibrinogen. Fibrinogen is present in normal blood, and is transformed into fibrin by the action of a ferment, thrombin; this ferment exists in the blood only in a potential way, and is called pre-ferment or inactive thrombogen. Coagulation occurs then only when the thrombogen becomes thrombin, which causes the transformation of fibrinogen into fibrin. This transformation is helped by many principles, such as calcium salts and organic extracts. According to Pawlow's theory of kinasis, it can be said that the thrombogen present in the circulating blood is transformed into active thrombin only when in contact with calcium salts or in the presence of thrombokinase, which can be derived either from the circulatory system, serum, leukocytes, blood, endothelium or from tissues (muscles, spleen, liver). Coagulation would then be a process of double fermentation, thrombogen for the thrombokinase, fibrinogen for the fibrin. It can be seen that the mechanism of the coagulation of the blood depends on a series of different factors. Authors admit that the lack of coagulability of the blood in hemorrhagic diseases is due to the fact that the plasma contains a small quantity of thrombokinase on account of some abnormality of the endothelium, of the leukocytes or of the tissues in general. So many pathologic processes can alter the general metabolism in such a way as to cause changes in the proportion, amount and activity of the different factors, that at the present time it is not always possible to establish which one is the cause of the different pathologic conditions.

The clot resulting from coagulation of the blood is at times soft; to stop hemorrhage the coagulum must be consistent and firm.

It can be said, as a conclusion in regard to the blood, two coefficients are indispensable—*coagulation of the blood, consistency of the coagulum.*

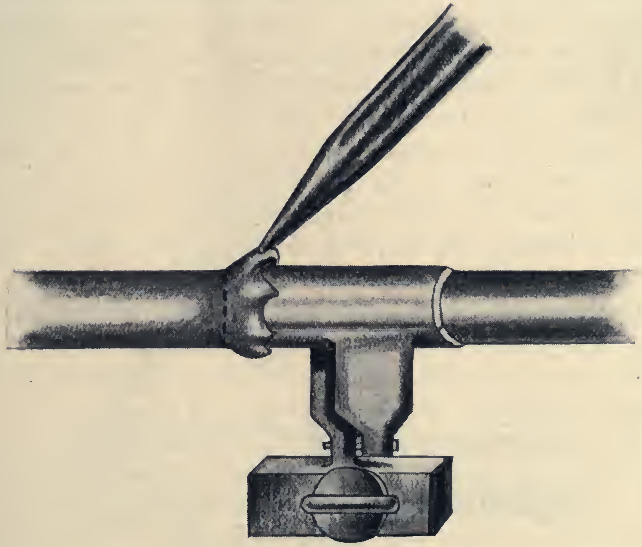

FIG. 3.—Showing how blood vessels are cuffed over the hooks while blood is still running in them. Dotted line shows where blood vessels must be cut.

Any blood vessel, no matter how large or how small, has a tendency to contract and retract when it is cut or torn.

Knowing the elements causing stoppage of hemorrhage, we can say that hemorrhage stops because (1) *the blood coagulates;* (2) *blood cannot pass through the coagulum when it is of a certain consistency;* (3) *the blood vessel contracts and retracts,* tightening itself around the coagulum, so that blood cannot pass between the intima and the blood clot; in a word, the thrombus fits the cut or torn end of the blood vessel, which by its contractions tightens itself around it.

The sealing of a blood vessel by the coagulum can be compared to the sealing of an elastic bottle with an elastic cork. This comparison will explain also the mechanism of persistent hemorrhage even when there is coagulation of blood. The coagulum might be soft and be compared to a spongy cork through which fluid could ooze. The elastic neck of the bottle might not have sufficient resiliency to tighten itself around the cork, so that, although the cork is consistent enough to prevent oozing of fluid, this oozes between the cork itself and the inside of the neck of the bottle.

It can then be said, although it cannot be proved, that the causes of the bleeding in hemorrhagic diathesis are to be found in the blood itself, and in the blood vessels, the condition being not a primary one, but showing itself in the blood just because the blood is the result of the very complex work of all the organs and cells of the body, of the activity of each organ and cell as individual entities and in relation with all the others, whether they are functionating physiologically or pathologically.

Many agents are thought to cause or to predispose to hemorrhagic conditions—syphilis, rickets, anemia, faulty intestinal fermentation and function of the liver, infectious diseases, improper food, etc. Each of them may be known as the cause in single cases, but none of them alone or altogether can explain all the cases of hemorrhagic diseases. So if in scorbutus improper food can be traced as the cause in the great majority of cases, it cannot be said that absolutely all cases of scorbutus are due to it. In hemorrhage of the newborn bleeding occurs from the mucous membranes of the digestive tract, from the umbilicus, beneath the skin, and from any surface or into any organ and cavity of the body and the infant might be apparently perfectly healthy or suffering from so many different conditions that no one of them can be given as the real and specific cause, and the same can be said in purpura. In hemophilia we have to be satisfied to say that it is hereditary, and affects more often males than females, and hemorrhage from a trivial cause can reveal the hemophiliac condition in children, anemic as well as perfectly strong and healthy ones, and whose parents were either in good condition or not. The fact that hemorrhagic diseases are more prevalent in children than in adults seems to point out that they are not primary diseases, but secondary manifestations of a metabolism not yet accustomed to the difficulties of life. Comparing the human body to a factory, it would seem that the different organs are not sufficiently developed to work harmoniously with each other, or they hamper each other and produce too much waste products, or do not produce enough of certain indispensable elements, so that they cannot stand some irregularities, which do not cause hemorrhage in the adult organism. And more light would be thrown on the subject if we take into consideration that with development of the body hemorrhagic diseases have a tendency to disappear, unless some pathologic condition altering the general metabolism, such as diseases of the liver, chloroform poisoning, certain infectious diseases, pernicious anemia, etc., attack the adult. The lack of coagulability of the blood in diseases of the liver is attributed to the fact that there is a deficiency of fibrinogen, which, being produced primarily by the liver, is wanting, because the liver cells, being diseased, do not produce the normal amount. As certain phenomena observed in hemorrhagic diseases have been compared to similar phenomena observed in chloroform poisoning, it would be interesting to see if hemorrhage of the newborn has been recorded and occurs in infants whose mothers

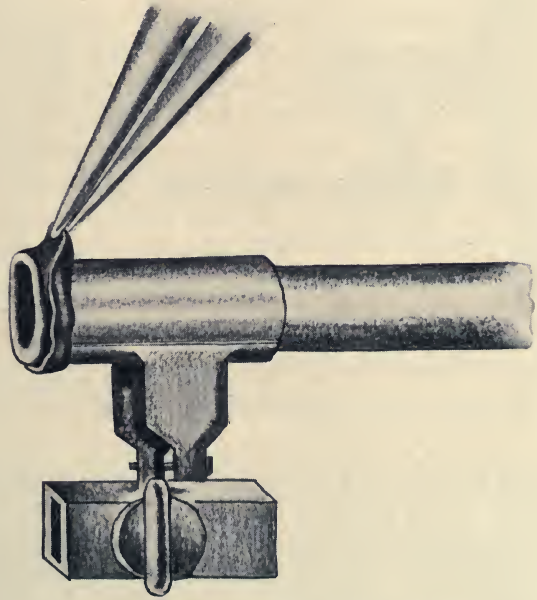

FIG. 4.—Showing how intima is easily completely everted.

have been delivered under chloroform anesthesia. The post-mortem findings are, up to the present time, not giving us any satisfactory explanation, because, beside finding the blood not coagulated many hours after death, extravasation of the same and anemia of the tissues, no lesion can be demonstrated which could explain the clinical and pathologic aspects of the hemorrhagic condition.

The diagnosis of these conditions at times is difficult, especially when severe hemorrhage occurs suddenly in the alimentary tract, or there is hemorrhage in the meninges.

Unfortunately prophylaxis can do very little or nothing at all except in scorbutus and hemophilia.

As in other pathologic conditions, the etiology and pathology of which is not established, the treatment is mostly symptomatic, except in scorbutus, where the change of diet is the main indication. Chemicals, such as calcium salts and styptics, have been found to be of very little value, except in very mild cases, which in all probability would have recovered spontaneously. Adrenalin has been found useful at times when applied directly to the bleeding points. Gelatin and peptones have lost favor and are of little service, notwithstanding some reported good results. In scorbutus and purpura a change of diet and administration of fresh fruit juice is followed by great improvement and often permanent cure. There is no record of cure in cases of Henoch's purpura, although direct transfusion done in time might be very valuable.

The prognosis is good in mild cases, which often are cured spontaneously; is very bad in neglected cases, when the loss of blood has been very severe, as children do not stand well hemorrhage, and the little patient's vitality is low on account of previous diseases and in hemorrhage occurring in the meninges.

Lately great advance has been made in the treatment of hemorrhagic conditions by what could be called the physiologic treatment, that is the use of blood or serum of animals and human beings. Whatever the pathology of these conditions is, it is a fact that the blood of normal individuals contains all the elements which maintain the tonicity of the blood vessels and take part in the process of stopping hemorrhage, so that it can be said that the blood treatment is the physiologic therapy of these conditions.

Blood in various ways has proven to be the best and most reliable agent at our disposal. Blood is applied in different ways. Blood serum, either human or taken from animals; full blood injected into the system or directly transfused from one person to another. Which of these means is the best? We can say that if blood was something that could be bought at the drug store and administered to the patient as we administer drugs, blood should be employed in every case. But as when we use blood in any form we have to deprive some one else of the amount of blood that we have to use, and its administration requires special training, we must be careful with its use. The treatment must be adapted to each case. When we are in the presence of a case seen early, and the loss of blood has not been severe, it is evident that the only indication is to stop further bleeding, and this can be very successfully accomplished, at times, with a simple injection of antitoxin serum. If human serum is at hand it can be injected either subcutaneously or directly into the veins. The injection of serum introduces into the system thrombin, which will establish the normal balance of antithrombin and thrombin or protothrombin, so that the circulating blood will be able to react normally. In some cases of hemophilia further bleeding has been stopped by applying a piece of gauze soaked with blood obtained from another person. On the other hand, we have cases where bleeding has been very severe, and we know that children stand very poorly severe hemorrhage; in these cases the life of the child is in danger from two causes—one is the persistent bleeding, which must be stopped, and the

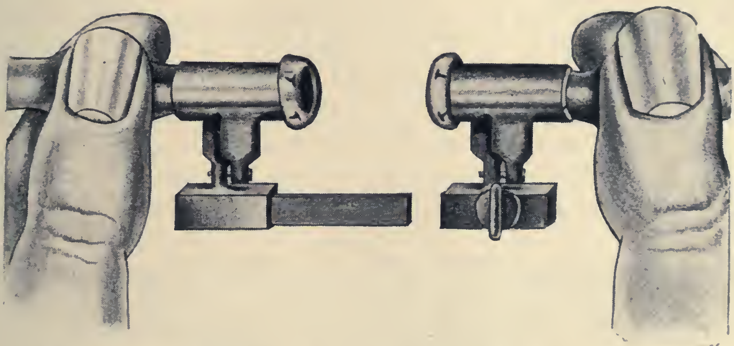

FIG. 5.—Showing how air is prevented from entering the open lumen of the veins till the blood vessels are put in close contact, as shown in Fig. 6.

other is the dilution of the blood, which would be unable to carry on the work demanded by the general metabolism, which is the function of the morphologic elements of the blood. It is evident that the injection of serum can only, at the best, stop further bleeding, but could not supply the morphologic elements of the blood lost through the hemorrhage. We accomplish all that is necessary by introducing into the system of the patient full normal blood from another person.

As the physiologic treatment of these conditions is based on the principle of injecting the elements of the blood which are wanting in the patient's system, it appears that the injection of full human blood should be preferred for the reason that, as long as we do not know yet which elements of the blood are really causing coagulation, and the normal blood contains all the necessary elements, it is logical to argue that the best thing is to inject the full blood with the certainty that all the elements favoring coagulation will be injected into the system of the recipient. *Only one consideration could favor the injection of serum in preference to full blood: if it could be demonstrated that in extracting the serum, new elements favoring coagulation are developed, or the existing ones are made more active. The same reasons hold good in regard to defibrinated blood.* If by the injection of serum or defibrinated blood less blood was necessary than by the use of full blood, in certain cases either one should be preferred, but as long as, in order to obtain the serum or the defibrinated blood, a quantity as large or even larger than the quantity used in transfusing full blood is necessary, the preference should be for the latter. *But the most striking argument in favor of full blood is the fact that many cases have been benefited and cured by the use of full blood, which had received previously all other treatments; while no case where transfusion has failed has been cured by other means.*

All hemorrhagic conditions, of whatever degree, and from whatever cause, find their specific treatment in direct blood transfusion. Unfortunately, many general practitioners, and even surgeons, think that direct transfusion should be resorted to only in extreme cases. Their belief is based on the idea that direct transfusion is a very difficult procedure; that it has failed in the hands of the very best surgeons; that it leaves large, ugly scars; that the preparation of donor and recipient requires too long a time and is not easy; that a donor is not always easily found;

that the necessity of examining thoroughly the blood of both donor and recipient in regard to hemolysis and diseases transmissible through the blood makes the procedure unsuitable in emergency cases; that children require a general anesthesia; that the whole procedure is not devoid of danger; that other means have been also successful—all these objections are the great obstacles to a more general use of direct transfusion, and each deserves an answer.

Direct transfusion is not a difficult procedure. It is only necessary for the surgeon to train himself to do work on the blood vessels, but as far as difficulty is concerned it is not more difficult than a hundred other surgical procedures which are practiced every day. I will later give a description of the technique which I devised and employ, and any surgeon will see that there is no difficulty in performing direct transfusion with said technique. It appears difficult because surgeons are not trained to do work on the blood vessels, and not being accustomed to do so generally they traumatize the blood vessels, the trauma favoring the formation of a thrombus, which does not allow the blood to flow from the donor to the recipient. But even if direct transfusion should be a very difficult procedure, as long as any surgeon can master its technique, it is our duty to learn the methods of treatment which are the very best without any regard to difficulty of performance. The patient comes to us to have the very best of treatment at the present time, and if we admit that direct transfusion properly applied and properly performed is the very best treatment for certain forms of diseases, it is our duty as surgeons to learn how to perform it. If

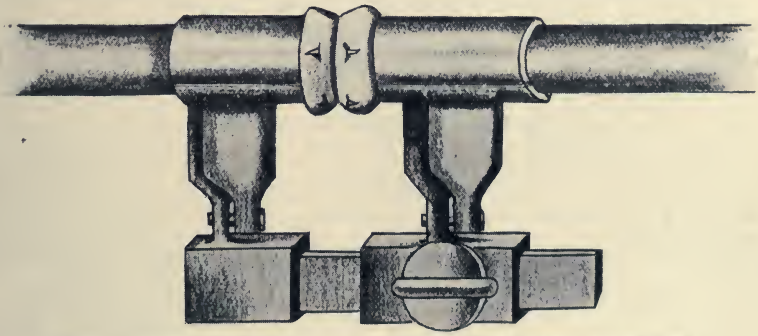

FIG. 6.—Blood vessels approximated; screw tightened; procedure completed.

the surgeon does not feel like wasting some of his valuable time in order to learn the best procedure to treat certain diseases, he had better give up his profession and do something else, but as long as he is practicing surgery it is his duty to learn the methods which are the very best for his patients.

Transfusion has failed technically in the hands of the very best surgeons. This is true. The reason of the failure is that when transfusion is not properly performed a thrombus forms between the blood vessel of the donor and the blood vessel of the recipient. The thrombus will not allow the flowing of the blood from one to the other. All our efforts are to be directed to prevent the formation of a clot at the point of anastomosis. With the proper physiological technique this can be easily avoided.

From the time that transfusion was first attempted surgeons have used a blood vessel of the donor in which the pressure was high, or have raised such pressure by artificial means. This has been done under the impression that the stream of blood coming from the donor under high pressure would overcome by the *vis a tergo* the *vis a fronte* in the veins of the recipient and so the blood of the donor would easily flow into the recipient. The most accepted procedure is to anastomose the radial artery of the donor with a vein of the limb of the recipient. Taking into consideration that the blood of the radial artery of the donor is under a pressure of about 110 mm. and the blood in the vein of the recipient is under a pressure of only about 15 mm., it seems logical to reason that the blood of the donor will flow freely into the system of the recipient. That this does not always occur is proved by the many failures of direct transfusion of blood. Even with perfect technique failure is commonly due, as said before, to the formation of a thrombus at the point of anastomosis. The blood of the donor does not flow freely, as is commonly supposed, and this is evident from the fact that transfusion is generally kept up for from one-half to one hour. A rough estimate of how much blood the donor would lose in that time from a severed radial artery clearly shows that the death of the donor would result if the blood was flowing freely. *Rarely the blood is flowing so rapidly from the donor to the recipient that the flow has to be slowed down by compression of the artery; in these cases, and only in these, is the blood flowing freely from the donor to the recipient.* Why then does the blood not flow in every case from the artery of the donor into the system of the recipient? Because the technique of using an artery of the donor and a vein of a limb of the recipient is wrong; to make the blood flow freely from donor to recipient the blood of the donor should flow without any obstacle directly into the heart of the recipient. *This is accomplished by using the external jugular vein of the recipient and is explained by the laws regulating the circulation of the blood.* When the blood leaves the blood vessel of the donor and enters the vein of the recipient it is no more under the influence of the heart of the donor, but under the influence of the heart and blood vessels of the recipient exclusively; and in order to circulate it must reach the heart of the recipient. Why this does not occur is easily explained. Blood pressure is highest at the left heart and negative at the right. This difference in pressure assures the circulation of the blood, which depends mainly on these factors; the blood is contained in a closed elastic system of vessels beginning and ending in the heart, which acts as a double pump by rhythmic continuous movements of expansion and contraction. The blood will flow where it meets least resistance, so an animal can be bled to death by severing any blood vessel and keeping its lumen opened, because there is no obstacle to the blood flowing out. In some pathologic conditions, such as shock

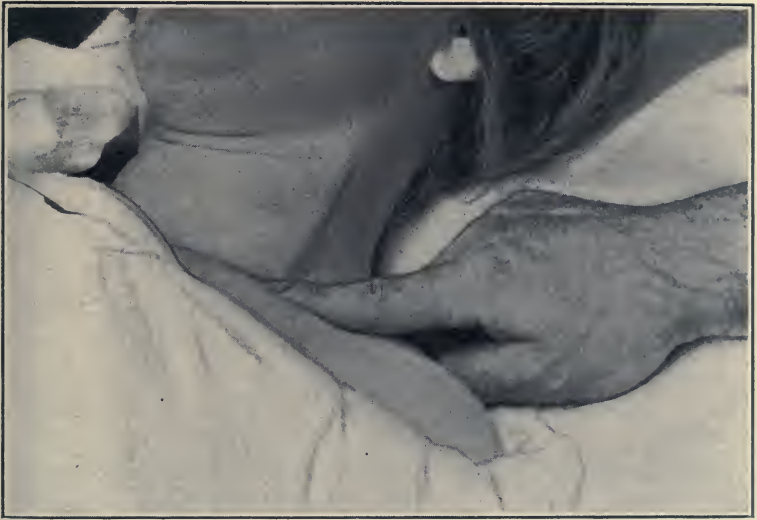

FIG. 7.—Location of external jugular vein; how to make it prominent.

or severe hemorrhage, the superficial blood vessels are almost bloodless and therefore collapsed. The blood flowing from the artery of the donor mets a great obstacle in the resistance offered by the narrowing of the lumen of the veins of the recipient. The veins have numerous ramifications, so that the further the blood flows the more resistance it meets. With increased resistance there is diminution of pressure, because the width of the bed in which the blood is flowing, when contained in the artery, is enormously increased in the venous system of the recipient. Trauma caused in making the anastomosis, and the dilatation of the channel, where the current necessarily becomes slow, at times so much that there is real stagnation of blood, are the most favorable elements for the formation of a thrombus on the traumatized intima of the vein, and I will here only mention the fact that when, as in most of the present methods, one blood vessel is cuffed over the instrument and the other is pulled over it, there is a dead space between the intima of the two blood vessels where the blood stagnates and coagulates, in this way helping the formation of a thrombus, which, in a short time, will occlude the point of anastomosis. This seldom occurs when the veins are fairly filled with blood; in these cases the blood flowing from the artery of the donor is carried very rapidly to the heart of the recipient and put in circulation immediately. Experimental work on animals shows that in dogs, where the same, or even more severe conditions than those which render transfusion necessary in human beings, are duplicated, the blood flows freely from donor to recipient, and the formation of a thrombus seldom occurs.

Transfusion directly into the heart best.

By using a vein of the neck of the recipient the conditions for the flowing of the blood from the donor are quite different from the conditions described above when using a vein of a limb. The pressure of the blood in the veins of the neck of the recipient is negative. and even in the most extreme anemias cannot oppose any resistance to the blood flowing from the vessels of the donor. As the blood flows where there is least resistance, by anastomosing the vessel of the donor with a vessel in the neck of the recipient, the blood will flow very freely from the vessel in which the pressure is positive to the one where the pressure is negative. By using a vein of the neck of the recipient the blood coming from the donor falls directly into the heart of the former, aided by the suction of the heart during dyastole and by the changes in pressure in the chest during inspiration and expiration. If the same technique as used in dogs is used in human beings, anastomosing a blood vessel of the donor with a blood vessel of the neck of the recipient, there is little possibility of a thrombus, and transfusion will be a safe, sure and easy procedure.

From these facts it is evident that the best technique is to use a vein for both donor and recipient. It is extremely easy to find a good sized vein in the arm of any adult as donor. For the recipient the external jugular vein should always be used for the physiologic reasons explained above and because the greatest difficulty met in performing transfusion in children is due to the fact that their superficial blood vessels are very small. It was then necessary to use the external femoral, which is of pretty good size, but not very superficial, *while the external jugular is both superficial and of sufficient size even in infants.*

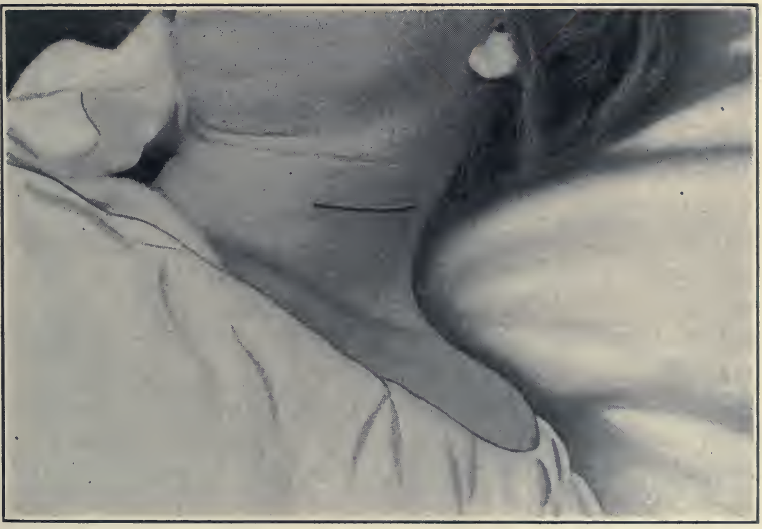

FIG. 8.—Line of incision.

It was difficult to find a donor when it was necessary to sacrifice the radial artery; the scar in the wrist is a large one and ugly; insurance companies do not take as a good risk a person who has lost a radial artery. As almost every one is sympathetic with babies and the amount of blood required for them is very small, and the necessity of sacrificing such an important artery as the radial is avoided, I never had any difficulty in securing a donor.

The complete examination of the blood in regard to hemolysis and transmission of diseases communicable through the blood was thought to be indispensable. Out of more than 500 cases which I collected from various surgeons, hemolysis occurred only once, and it was in a patient suffering from pernicious anemia. The examination of the blood in regard to hemolysis can be omitted, especially when the donor is a relative and in all emergency cases. Only in exceptional cases it will be necessary to examine the blood in regard to diseases communicable through the blood, although when the surgeon has to employ as donor a stranger it is advisable to do so, especially in regard to syphilis.

General anesthesia is absolutely contraindicated; in many cases it would be sufficient to produce the child's death, and it is not at all necessary. Cocain solution, 1 to 500, is sufficient to produce perfect anesthesia. No adrenalin should be added to the solution, as it contracts the blood vessels. A fine needle, very sharp, is all that is demanded in order not to cause unnecessary pain. *First produce a bleb and then proceed to inject the solution, introducing the needle always on the edge of the bleb,* until a line somewhat longer than the intended incision is completely anesthetized. With gentle dissection the child will not notice that he is operated.

The experience I have gained in performing transfusion in children leads me to give the following suggestions: Prepare the donor first, so that the child does not grow impatient. If the surgeon performing transfusion is also the family physician, or one who has given some disagreeable medicine, or caused any kind of pain previously, he had better let someone else prepare the child, or do things in such a way as not to be seen; the child's face should be covered, leaving only the neck exposed, and he had better not see the operating room. The best results are obtained when the child is distracted, and this is easily done if a sympathetic person or a relative, who can stand the sight of the procedure, pets him while the surgeon is doing his work. It is not difficult to do all these things, because the whole procedure should not last more than about fifteen minutes.

Some physicians still think that the procedure of direct transfusion is not devoid of danger. There is the same amount of risk as in any other ordinary surgical operation, strict asepsis and good surgical training being the indispensable requirements. The danger of introducing air into the open lumen of the external jugular is completely avoided by using the technique which will be explained later.

Other means have been successful in many cases and blood transfusion should not be resorted to in every case. But it has to be remembered that, when the loss of blood has been severe, no other therapeutic agent alone or a combination of such can supply the wants of the patients as well as full healthy blood. The patient needs the morphologic elements of the blood which are indispensable to carry on the work of the general metabolism; he has lost those elements through the hemorrhage and the only manner in which we can help him is to give him new

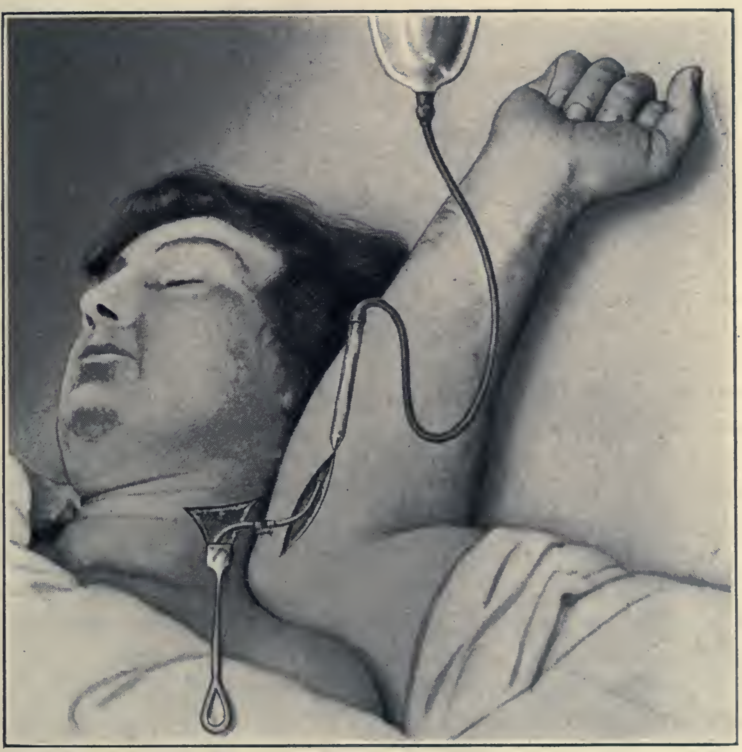

FIG. 9.—Position of donor and recipient; irrigator containing warm sterile saline solution for continuous flushing of the blood vessels.

elements which can take the place of the lost ones. This cannot be accomplished by any other means but direct transfusion of blood, which saves the integrity and complete vitality of the elements of the blood so that they continue in the new organism the same function they were accomplishing in the organism of the donor. Beside taking up the work of the general metabolism the blood transfused will stop further bleeding more certainly and rapidly than all other means combined.

Failures in the employment of direct transfusion are due to the fact that it is resorted to, very often too late, when the patient is absolutely moribund, and after having aggravated his condition by injecting into his system all the medicines and sera the physician had at his disposal. It is not fair to record as failures due to transfusion cases in whom all the imaginable therapeutic means have been tried unsuccessfully and transfusion was employed as a last resort to satisfy one's self and the patient's family. A fair comparison between the absolute therapeutic value of direct transfusion and the other means resorted to in the treatment of hemorrhagic conditions could only be made if direct transfusion was employed as those other therapeutic agents are, that is, as first aid and not as last resort.

In these cases the addition of one drug to another, of different sera, etc., has induced so many changes in the patient's system and blood that its resistance is diminished, its hemolytic power increased, and the transfused blood fails to help, because it is immediately altered when it enters the patient's system. If direct transfusion were resorted to as first aid and not too late, we would in all probability have 100 per cent. of cures; such has been the case in 19 patients who were transfused before receiving other treatment, as will be reported later.

Few words of warning must be said in regard to the administration of normal saline solution in any of the numerous manners in which it can be done—hypodermoclysis, proctoclysis, infusion in the veins, etc. It must be remembered that the addition of liquids to the blood will dilute the same and therefore decrease the per cent. of the elements which are the factors of coagulation; liquids, therefore, should be administered very sparingly.

The technique for the extraction of the serum or the defibrination of the blood is not as easy as it seems to be; only an expert in laboratory work or a surgeon with great experience can be trusted to do all the different manipulations required. The whole procedure of extracting the blood from a person, preparing its serum or defibrinating it, injecting it in the patient's system, is certainly more difficult and complicated and requires more time than a direct transfusion of blood.

Special care is necessary to keep the serum in good condition; the injections of the same must be repeated for a long period, at times a week, during which time the patient is always in danger of a new hemorrhage and the surgeon must be at hand to attend to it. The amount injected is very great—about 500 c.c.

When the surgeons favoring the use of serum or defibrinated blood say that the injection of either one is simpler than direct transfusion they forget to add that if the injection in itself is simple enough the injection is only the last and easiest step of a very difficult and complicated procedure, requiring more training than it is necessary for an expert surgeon to master the technique of direct transfusion.

The injection of full blood deserves a special mention. In the past centuries indirect transfusion of blood has been used, and surgeons invented the most ingenious instruments which would render the procedure easy and rapid, but it was abandoned not because it did not give good results, but because there is a possibility of traumatizing the blood. With the best aseptic precautions it is possible to inject blood even through an hypodermic syringe at times, but the risks of blood clotting are very great, and nowadays we are looking for procedures which technically give us the maximum percentage of good results. In direct transfusion well performed we have a means of giving a patient some blood which is not traumatized and will live in his system as it was in the donor's system. We are sure that we can accomplish that much. With injection of blood or indirect blood transfusion no one can be sure that technically the procedure will succeed; no one can be sure that the blood will not clot—will not form emboli. With direct transfusion it is a matter of training and skill; technically, there should not be a failure. With the indirect method it is a question of luck and of taking chances; no matter how great the skill of the surgeon is, there can be no certainty that all complications can be avoided. The same amount of blood is necessary in indirect as in direct transfusion, probably in the former more is required, because some gets wasted; the preparations and precautions to be taken are the same, if not greater, in the indirect method. I fail, therefore, to see what the advantages the indirect method can have over the direct.

Through recent literature and by personal letters sent to hospitals, the author has collected 51 cases in whom direct transfusion has been resorted to, 9 of these being personal. The surgeons who have contributed to this statistic and to whom I express my thanks are: J. R. Beiter, G. E. Brewer, A. Carrel, C. E. Farr, G. C. Fisher, J. M. Flint, H. H. Germain, Ch. Goodman, F. D. Gray, Lakeside Hospital, Cleveland; S. W. Lambert, V. D. Lespinasse, R. D. McClure, H. O. Mosenthal, K. R. Parmanter, E. H. Pool, W. C. Seely, W. J. Terry. These cases were: 27 hemorrhagic diseases of the newborn with only three failures; 15 cases of hemophilia with but two failures; 6 cases of purpura with five failures; 3 cases of scorbutus with two failures. It would seem that direct transfusion has been a specific treatment in hemorrhagic diseases of the newborn and in hemophilia, while in purpura and scorbutus the results are not very good. The difficulty complained of by almost all the above-mentioned surgeons is the smallness of the vein of the child, which had made transfusion extremely difficult in many cases; this difficulty is avoided by using the external jugular as explained above. It is possible that if all the cases in whom transfusion has been resorted to could be collected statistics would show a greater number of failures which were certainly due to the factors mentioned above. In the cases of hemorrhagic diseases of the newborn the cure is permanent; in hemophilia more often it is only temporary, and to obtain the best final results the patient must be put in the best hygienic surroundings and given a continuous general treatment. In scorbutus the results would be more encouraging if transfusion was resorted to as soon as it is seen that the change of diet and the bettering of the patient's surroundings are not sufficient to effect a cure. In purpura, when the case is very serious, unless transfusion is resorted to immediately there can be little hope of helping the patient, death occurring in a very short time. I would like to report *in extenso* the histories of my patients, but it would require too much space and I will limit myself to a brief mention of 2 cases of special interest. One is the case whom I presented before this Pediatric Section. The patient, aged four, had pertussis for about three months; his condition grew worse and he began to bleed from the gums and nose after attacks of cough. When seen by the author there was a temperature of 102°F.; gums inflamed and swollen; the left eye and ear were purulent and there was empyema on the left side. The most urgent indication was the evacuation of the pus from the pleural cavity; this was done immediately under local cocain anesthesia. The child was in extremely bad condition and not expected to live. Twelve hours after the operation the child seemed to get worse; the dressing was full of pus and blood, which was oozing out of the cut edges of the wound. Hemoglobin at this time was 60 per cent. Local applications did not stop bleeding, which was more marked also from the gums. On the fourth day the hemoglobin had gone down to 35 per cent. Transfusion was advised and resorted to till hemoglobin was 60 per cent.; bleeding stopped and child made an uneventful recovery. The case is interesting because the hemorrhagic condition seems to have been due to sepsis.

The other case seems interesting on account of the peculiar difficulties met in performing transfusion. Child about five years old seen in consultation with Dr. E. Stein, of Elizabeth, N. J., was suffering from scorbutus, and in moribund condition. The donor was a stranger. I isolated his radial artery and the procedure was extremely difficult because there had been a Colles fracture only about forty days previously. The donor was terribly impatient, and to quiet him I made the mistake of giving him some whiskey. After many difficulties the radial artery was anastomosed with the external jugular of the recipient and blood was flowing freely, but the donor was so restless that he was moving his arm all the time, stretching the blood vessels so that very little, if any blood at all, was flowing into the recipient's system. After about twenty minutes transfusion was stopped on account of the excited condition of the donor, who was as restless as an insane or intoxicated man would be. The child received very little blood, if any at all, and died the next day. I have, up to date, performed 54 transfusions and never met complications I thought worth reporting.

I will briefly describe the technique which I employed and that has proved *technically* successful in every case, but the one mentioned above. Disinfect right forearm and neck with tincture of iodin; rub off iodin with alcohol; inject cocain solution, 1 to

500, along the ulnar vein, anterior and posterior; make skin incision between them about 5 cm. long. After having isolated the donor vessel cover with gauze soaked in warm saline solution and keep it warm. Make incision in the neck of the child along one of the skin folds about 2 cm. in length. Isolate external jugular (left), cover with gauze as done for donor. Approximate donor and recipient. The author's canula is composed of two halves, which can be opened on their longitudinal axis, and are put and held together by a little bar and a screw. (Figs. 1 and 2.) On the side where the two halves of the canula touch each other there are four sharp hooks. Open the canula, insert recipient's vein into it, and with small, blunt thumb forceps cuff it over the canula; the hooks will hold it firmly; do the same thing for the donor's vessel. Cut recipient's vein close to the canula, catching other side with an artery forceps, evert intima over the canula and pour saline solution on it; do the same for the donor's vein. (Fig. 3.) Put thumb and index finger around blood vessels close to the canula. (Fig. 4.) Insert bar of one-half of the instrument into the corresponding hole of the other half, take your fingers off, let the blood flow, *and while it is flowing approximate the two blood vessels; tighten the screw and continue the dropping of saline solution. The procedure is completed.* Ligate the ends of the blood vessels held by the artery forceps.

It can be seen that all the conditions for the free flow of blood from donor to recipient are met in this anastomosis; the intima of both veins at the point of contact has not, even slightly, been traumatized; the two veins are so closely approximated that they form a continuous blood vessel.

When it is time to stop transfusion pass a strand of catgut No. 1 around the blood vessels about 2 m.m. from the canula, ligate and cut close to the canula.

Precautions to be observed are: In order to locate the external jugular make a slight pressure over the middle of the clavicle. Pour saline solution on the blood vessels of both donor and recipient from the moment they are exposed to the moment it is time to stop transfusion. There must be no tension between the blood vessels and they must be handled very gently. In exposing the vein of the donor choose between the anterior, posterior and common ulnar the one that corresponds better to the size of the child's vein. Remember that transfusion must proceed slowly; if the blood is flowing too rapidly make slight pressure on the donor's vein. Transfusion should last only a few minutes; a child does not need much blood. The best way to know when to stop is by taking the hemoglobin every minute and observe the child's color. When hemoglobin has increased about 20 per cent. it is time to stop. For more details of technique I refer to my previous articles.

As a conclusion, I would make a plea for a more general use of direct transfusion in hemorrhagic diseases, remembering that it has to be resorted to in time, and not be undertaken by a surgeon, who is not the absolute master of the technique, which can and should be learned on living animals.

RADICAL TREATMENT OF UMBILICAL HERNIA IN CHILDREN.—Vittorio Brun (*Arch. de méd. des Enf.*, September, 1912) advocates a new method of radical treatment of umbilical hernia in young children. He makes use of an elastic ligature placed about the redundant navel mass, so arranged that it is subcutaneous, and that its contraction causes a gradual cutting off of the blood supply and nutrition, with the gradual formation of a cicatrix, which is entirely subcutaneous and does not show externally. The rubber ligature is inserted threaded into a curved needle and passed half-way around the navel; a second entrance of the needle carrying it around the other side, and the whole drawn tight and fastened with silk. The elastic ligature is sterilized by immersion in alcohol and glacial acetic acid. In a few days all the hernial parts are cut through, while adhesions are established in the peritoneum which seal off the cavity. After two weeks the entire ligature may be removed through the inferior wound, left open for that purpose. A complete cure is established and the trouble will not recur. The author has seen 244 hernias operated on by this method in children from two months to nine years old. Age has no influence on the result. The sooner it is attempted the better the result. The operation is simple, painless, and efficient. It can be done in five or six minutes; in small children no narcosis is necessary, while chlorid of ethyl is sufficient in older children. Few of the patients need to be kept in the hospital, most of them going home and being visited there.—*American Journal of Obstetrics.*

A UNIQUE CASE OF CONGENITAL SCOLIOSIS.

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AND

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Perronne has classified congenital deformation of the spinal column into vertebral deformities without malformation of other parts, and vertebral deformities with malformation of other parts. The first of these he has subdivided into three groups: (1) the class due to increase in the number of the vertebræ; (2) the class due to deficiency in whole or part vertebræ; (3) the condition of synostosis.

We wish to record a case which may be considered unique in so far as any publications we have seen are concerned. The condition will be most appropriately grouped under section two of the first division in Perronne's classification.

Clinical History.—M. K. Girl, one year, eight months and twelve days old.

The patient was brought to us by the parents on account of the fact that there was considerable delay in her walking powers, and further because of a lateral curve in the lower dorsal spine.

The spine curve had only been noticed since the child had attempted to walk.

On examination the child was found to be a healthy, well-nourished child. It walked hesitatingly, and as it did so there became evident a distinct right lateral curve in the lower dorsal spine. The scoliosis could be corrected by extending the child and all the movements of the spine were perfectly free and painless.

Measurements of the lower limbs showed no shortening and the knee jerks were not exaggerated.

Throughout the body there were no changes compensatory to the scoliosis.

Family history showed no evidence of heredity.

X-Ray Examination:—

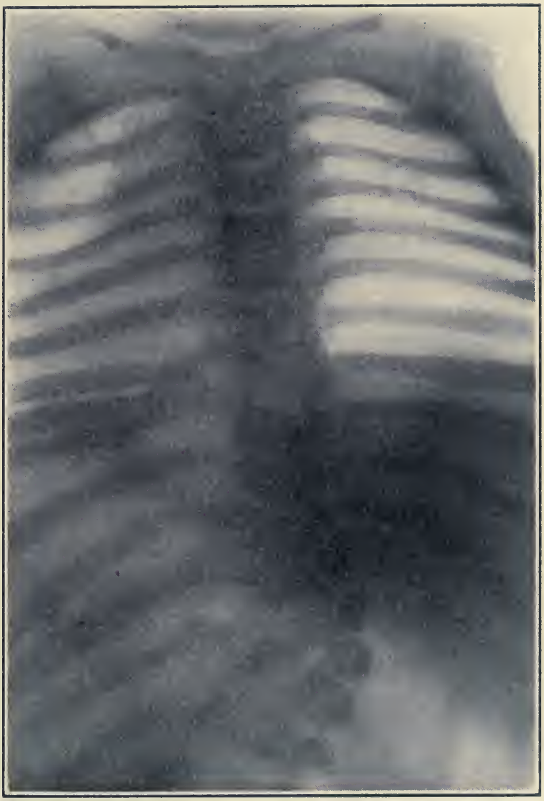

Fig. 1.—Showing changes in vertebræ and ribs.

The changes are obvious on reference to the figure. There are alterations in the vertebræ and in the ribs.

Vertebral Changes.—The seventh and eighth dorsal vertebræ are incomplete. Upon the right side there are half vertebræ and each half tends to be wedge shaped. Upon the left side the two vertebræ have fused into a single wedge shaped bone.

The last dorsal vertebra is divided into two halves by a mesial division, but the shape of each half is more or less preserved.

In the lumbar region of the spine the first three lumbar vertebræ are incomplete, the right halves are present and each is distinctly wedge shaped.

Upon the left side the vertebræ have become two separate bones, an oval bone equal in depth to the body of a healthy vertebra, and a small wedge shaped bone lying more anterior.

Rib Changes.—Upon the left side there are thirteen ribs and possibly a suspicion of a fourteenth.

The ribs of the left side corresponding to the seventh, eighth and ninth dorsal vertebræ have become fused about one inch from the side of the vertebral column into a single broad rib; and this single rib articulates with the vertebral column by two short processes. One of these processes is attached to the ninth dorsal vertebra, the other to the wedge shaped remnant of the seventh and eighth vertebræ.

There have been numerous recorded instances in which congenital abnormalities have occurred in one part of the spine, but we have been unable to find any records of cases in which the deformity was duplicated and complicated by the fusion of the ribs.

It will be extremely interesting to observe the further history of this case.

We have considered it unnecessary to append a complete list of references; the literature is most fully given in articles by Perronne and Port.

REFERENCES.

Perronne, A. Zeits. für Orth. Chir., 1906, Vol. XV., S. 353.
Port, K. Zeits. für Orth. Chir., 1904, Vol. XII., S. 354.

Treatment of Nocturnal Enuresis.—After briefly reviewing the many methods of treatment advised, Mello-Leitaõ (*British Journal of Children's Diseases,* 1912, Vol. IX., p. 454) reports 5 cases cured by Cathelin's method of epidural injections of artificial serum. This method, the writer states, acts by suggestion. In 2 other cases these injections failed, and in 1 of them lumbar punctures were also unsuccessful while the other recovered under renal opotherapy. Fresh sheep kidneys, 10 grams daily, were given for over eight months though enuresis ceased on the thirty-eighth day.—*American Journal of Obstetrics.*

MILK STATIONS OR INFANT MORTALITY.*

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Blue Front Milk Stations do not mean simply pure milk, but a combination of good milk, a capable matron to handle it, a place for mothers to bring strong babies to keep them strong, or weak or sick babies, a nurse to meet them and return to the home to treat the sick baby and teach the mother how to care for and feed the infant, and a physician to oversee, direct and encourage all. This is what a milk station is in a thickly populated section of a city. Leave any item out and the success of the station decreases.

Dr. Getty, in an article entitled "The Sterilized Milk Dispensary of St. John's Riverside Hospital and its Work," tells of the origin in Yonkers of the work of preparing pasteurized modified milk for the poor of our city. He showed a reduction for the summer months of 1896 from an average of 162 under five years of age of all diseases to 135, or 37 per cent.; and of digestive troubles from 91 to 48, or 47 per cent. In another article by him in the *Journal of American Medical Association*, 1908, entitled "Infant Mortality in Summer Months," he shows that the drop of 1896 could be maintained. That the inspection and improvement of the tenement conditions, the better inspection of the milk and better appreciation by physicians of the method of attacking intestinal diseases, all helped to maintain the low record. (See Chart No. 1.)

Since 1906 the deaths from all diseases per 1,000 population in the four summer months of children under five years of age showed a gradual reduction from 2.5 per 1,000 of Dr. Getty's figures to 1.5 per 1,000 in 1912. From Dr. Getty's figures of drops under five years of age from intestinal diseases, from 2.9 per 1,000 in 1889 to 1.4 per 1,000 in 1899-1903, and remaining the same to 1906, the record under two years (which is quite similar to the five, as few children die of these diseases between two and five) was 1.4 per 1,000 in 1907, then going up and down until at 1.2 per 1,000, in 1911, it did not go up, but came down to .8 per 1,000 in 1912, or a drop of 33⅓ per cent. from 1911 figures.

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* Read before the Practitioners' Club, Yonkers, N. Y., October 30, 1912.

We find by comparing the reduction of deaths under one year of age at the end of our first year with milk stations, and that of other cities with their active efforts with one or more years' work, as reported by the New York Milk Committee, our percentage of reduction from estimated deaths is only exceeded by Buffalo. Take our lowest year, 1908, for June, July and August, and the increase in population should give a mortality of 144 in 1912, but only 90 died—a reduction of 38.2 per cent.

This year the St. John's Riverside Hospital Milk Dispensary changed its name to Yonkers Milk Committee, and added to its membership representatives of the St. Joseph's and Homeopathic Hospitals, and, working with the Bureau of Health, started June 1st two Blue Front Milk Stations in congested districts. The stations and two nurses were furnished by the Bureau of Health, the two matrons, most of the equipment and pasteurized milk to set formulæ were furnished by the Committee.

Physicians of the Bureau of Health and of the Committee conducted bi-weekly clinics for the weighing of babies and instruction of mothers as to the care of their infants, and how to maintain their breast milk or, if that is impossible, how to feed them, the mothers sending to the station daily for modified milk. The nurse followed the babies to the homes and irrigated or taught the mother how to care for or feed the little ones. All cases of intestinal diseases in children under two years of age were cared for by the nurse, whether under the care of the station or outside physician.

This year it was not a case of keeping babies well, for the mothers had not been educated to that, but of getting the sick ones well and keeping them well. In this our work differed from that of most stations in New York where prevention was the main work of the station and the treating of the sick the work of district nurses.

During the four summer months there came under the observation of the two stations either for nursing, for food or for general station care, 364 sick babies (some in desperate condition, dying that day or the next). Of these, 32 died. Besides the sick ones 113 well babies came to the clinics, making a total of 477 that have been under observation. Of these children there were 187 that came to the station and had weight charts made for them. Of these, 12 died, 5 left the city, 5 were transferred to other stations, 7 became over age of two, 31 dropped out or are very delinquent, 38 have been investigated and promised to return, and 89 were still attending clinics October 1st. (There were 45 at the two clinics to-day, October 30th.)

The babies, while attending the clinics, with very few exceptions, have gained weight. The greatest gain was in a bottle baby; in nine weeks he gained 5 pounds, 9 ounces, or $9\,{}^{8}/_{9}$ ounces per week. The next was a breast baby, who in five weeks gained 3 pounds, 1 ounce, or $9\frac{4}{5}$ ounces per week. The whole number of babies have made 731 calls at the stations; 1,541 calls were made at the homes for sick children and 750 calls for well ones, 104 calls of coöperation, 82 calls when baby was not found, or a total number of house calls for babies for two nurses for four months of 2,477, and 850 calls for the instruction of mothers, and 59 mothers have been taught home modification of milk.

Besides this there were 731 calls at the stations and clinics and general work at the stations. Of the 750 calls on well babies 450 were birth calls made upon every baby in the tenement districts for which a birth certificate has been received at the Bureau of Health. The nurse gives the mother general directions as to the care of the babe and encourages her to bring it to the station if it does not seem well. It will then get under the care of the family or health physician before it gets seriously sick. If a child is found under normal the nurse makes subsequent visits under the direction of the physician, until normal condition is reached. Many of these babies would soon have been put upon condensed milk or the various patent foods, so that the mother could return to the factory.

The nurse encourages the mother to continue nursing and brings her to the clinic for the doctor to tell her how to improve the quantity and quality of her milk. If compelled to go to work the mother is taught how to prepare modified milk to be used while she is at work, or, if her milk gives out entirely, how to put the baby on a bottle and how to keep things clean. Many doctors have sent the nurse to private patients who cannot nurse their babies, to have them show the mothers how to prepare their bottles and modify the milk.

During the summer pasteurized milk to set formulæ has been dispensed from the stations, but just before October 1st the nurses taught the mothers home modification, and most of them have learned very well, and babies are gaining nicely. During the four months 5,167 quarts of milk were made in the laboratory into 575 quarts and 31,869 smaller bottles, of which 514 quarts and 27,270 small bottles were dispensed. The milk used was one produced in Yonkers and the night's milking was iced immediately and sent to the laboratory to be made up and pasteurized in three or four hours after milking.

The infant mortality or number of deaths under one year in proportion to the number of births, we can only compare from January 1st to October 1st in each year. (See Chart No. 3.) Since 1907 it varied from 181 to 170 in 1909 with rapid reduction to 120 in 1912. Part of this reduction may be due to more complete birth reports during the last two years.

Looking close at the figures for the first nine months of the last five years we see (as per chart) that the deaths under five years were in 1907—303; at this rate, with the increase in population, it should be in 1912—399; but only 280 have died, making a saving of 119 lives.

In the one year class in 1907 it was 218, and by the same method should be in 1912, 287, but it was 215, or 72 were saved.

Under two years, of diarrheal diseases, in 1907 it was 108, and by the same method should be in 1912, 142, but 96 died, making a saving of 46 lives in this class.

In the five year class part of the drop this year is accounted for by the fact that there were fewer contagious diseases last spring. In 1909, from January 1st to May 30th, there were, in the city, 240 cases of scarlet fever, 77 of diphtheria and 378 of measles. In 1912, 203 of scarlet fever, 108 of diphtheria and 126 of measles. These diseases either are the cause of death or make the children weak so they cannot stand later sickness.

The Chart No. 4, for the four summer months, shows that the drop in diarrheal diseases for the last two years has pulled down the number in the one and five year classes about the same amount.

In 1911:	Diarrheal class drops	13
	Five year " "	14
	One year " "	24
In 1912:	Diarrheal class drops	29
	Five year " "	32
	One year " "	23

In the five year class the deaths for 1907 were 173. This, with the increase of population, should have made for 1912, 228, but only 137 died, making a saving of 91 lives. In the same manner, for diarrheal diseases under two years, it should have been 127, but was 75, and 52 were saved. In the one year class it should have been 172, but only 106 died, a reduction of 66.

You will notice that the diarrheal diseases are usually higher every other year, but in 1912, instead of going up, they dropped 29, or 27 per cent. below 1911, and 42, or 37 per cent. below 1910, even with the increase in population.

The maximum temperature for the days of the summer months were as follows:—

	1910.	1911.	1912.
100 degrees or over	0	5	
95 “ “ “	4	8	5
90 “ “ “	26	23	14
85 “ “ “	41	45	46
Average for four months ..	83°	82.6°	82.7°
Rainfall for four months ..	7.53 in.	15.35 in.	9.57 in.
Rainy days for four months	# 20+12	31+9	20+10

# .01 inch or over + under .01 inch.

The decrease of 13 deaths in 1911 from 1910 may have been partly from the fact that there were 15.35 inches of rain against 7.53 in 1910, and forty days of some rain against thirty-two of 1910, partly from greater use of B. B. culture or fewer diarrheal cases. The drop of 29 in 1912 is with unfavorable rainfall and rainy days.

The State Bulletin of Health in this month reports: "There has seldom been a year in which July had so few deaths as 1912, and the saving is in infant mortality. Twenty years ago it was common for 50 per cent. of the deaths in July to be children under five; this year it is down to 30 per cent. The rural districts remain about the same, but the cities have had great reductions." This is because of the organized effort by the milk station to give thorough care and education to the tenement districts.

The cost for the four months' work in Yonkers has been as follows:—

Laboratory:	Labor, repairs, cartage, milk, ice, etc.		$1,230.84
	Milk sales		536.77
	Net cost		$ 694.07
Two stations equipment			126.89
" " maintenance—			
	Matrons, printing, plumbing, etc.	$458.79	
	Nurses, rent, carfare, painting, etc.	935.22	1,394.01
			$2,214.97

The maintenance of two stations for four months is	1,394.01
This will make for one station a month	174.38
This will make per year for a station, about	2,000.00

THE TREATMENT OF ASTHMA IN CHILDREN.—Knopf (*Berlin. klin. Woch.*, August 12, 1912), in calling attention to this not uncommon affection, believes that the treatment should be largely directed to insistence on proper breathing. The principal evidence of the asthmatic symptom-complex is shown by the disturbance in the relation between the thoracic and abdominal respiratory movements. While the former are engaged in inspiration, the latter are undergoing expiratory movements. In addition to overcoming this part of the disturbance it is also necessary to insist on proper nutrition and digestion, it being essential that the stomach is thoroughly emptied before the child goes to sleep. Any disturbances in the nervous system which may be present must also be adjusted and the effect of the child's environment studied, a change in climate being indicated both for its physical as well as its psychic effects. Although asthma in children is apt to disappear at the time of puberty, the interval is accompanied by much discomfort and possible anatomic changes which cannot be corrected.—*American Journal of Obstetrics.*

ABORTIVE TYPES OF SMALL-POX.

BY L. A. SEXTON, M.D.,

Resident Physician Willard Parker and Reception Hospitals, New York.

There are few diseases known to the profession whose symptomatology is more constant and characteristic than small-pox. The following case history, which proved beyond any doubt to be a genuine case of small-pox, and in the early stages of the disease showed practically no symptoms which could be classified as typical of the disease, goes to show that we cannot ever be guided by any set of fixed rules in making a diagnosis, but that every case possesses its own peculiarities, and is a law unto itself.

The onset of small-pox may easily be confounded with any number of similar conditions. Even with the appearance of the eruption we have to keep constantly in mind measles, morbiliform types of scarlet fever, typhoid fever, typhus fever and cerebrospinal meningitis, but with the appearance of the pustular stage of the disease all of the above can readily be excluded. It is at this stage of the disease we have the greatest difficulty in differentiating those conditions which so closely resemble small-pox in many of its phases. Particularly is this true when we are contending with mild and abortive types, such as we are about to describe.

It is here we have to consider chicken-pox, which is usually the most perplexing, pustular syphilide, which in many instances presents a strong resemblance to small-pox. Drug eruptions, chief of which follows the ingestion of large doses of bromides, and presents an appearance likely to mislead the unsuspecting. Iodid eruptions, while sometimes confusing, are less liable to be mistaken for small-pox than those caused by bromides. Any one of the above may easily be mistaken for small-pox of the abortive type. There can be no doubt that greater importance attaches to this class of cases than to those whose diagnoses cannot be questioned. While in themselves they may be mild, we have no assurance that when transmitted they may not be of the most virulent type.

In the case of W. W., aged twenty-seven years, occupation laborer, admitted to Reception Hospital on November 5, 1912, four days ill, he contracted the disease while on a trip through southern Texas and Louisiana. The patient felt perfectly well all the time, and the first intimation of the disease occurred with the appearance of the eruption on his face. This condition caused him to go into Bellevue Hospital, where a diagnosis of chickenpox was made, and it was only by chance that he was seen by Doctor Somerset and sent to Reception Hospital.

At the time of admission the eruption on his face was undergoing dessication and by the end of the sixth day had practically disappeared. The eruption was discrete and appeared in the form of pustules; contrary to the regular form, which appear as a macule, then as a firm, "shotty" papule which slowly increases in size and develops into vesicles, which, after about three days, become pustular.

The lesions came out in successive crops, which is quite contrary to the usual appearance of small-pox, which comes in a single crop, and the lesions remain uniform in character. A new pustular lesion could be found alongside one which had undergone dessication. This condition continued and I found two new pustular lesions on the tenth day of the disease.

The lesions, in addition to appearing as pustules, were not multilocular and very few showed any umbilication. The distribution of the eruption was quite typical of small-pox, the hands and the feet being chiefly involved. There were present about fifty typical lesions on the sole of each foot. The appearance of the lesions as dessication progressed were perfectly typical of small-pox.

The patient was vaccinated on the fifth day of the disease, never having been vaccinated before, but this was unsuccessful. A monkey was vaccinated in four places with pus taken from the lesions on the fifth day of the disease, and each of these vaccinations showed a marked reaction on the third day, and became vesicular on the fifth day and pustular on the sixth and seventh day after inoculation. They were very itchy and the monkey by scratching inoculated himself in numerous other places.

The patient felt perfectly well and ran a normal temperature pulse and respiration during the entire attack.

BRIEF DIFFERENTIATION.

TYPICAL ONSET AND COURSE.	CASE IN QUESTION.
Chill, followed immediately by high temperature, headache, sore throat, pains in back and limbs, chilly sensations, vertigo.	Total absence of constitutional involvement.
ERUPTION	ERUPTION.
Appearance of small macular spots, at first pink, becoming darker in hue, and resembling flea bites, becoming hard "Shotty" papules by the second or third day. By the fifth day becoming vesicles which umbilicate.	Appeared in form of pustules.
On the sixth or seventh day become pustular and usually reach the height of their development by the eighth or ninth day of the disease. Multilocular in type. Not easily broken. Deeply seated in the skin with indurated base.	Very few lesions showed any umbilication. Were not multilocular. Not easily broken. Induration typical.
Secondary high temperature with height of the eruption.	No temperature at any time.
Distribution of eruption with sites of involvement in their order.	Distribution typical.
Face, scalp, neck, hands, feet and body, always seeking preferably the exposed surfaces.	
Coming out in a single crop and remaining uniform in character.	Came out in successive crops. New and dessicated lesions. side by side as late as the tenth day of the disease. Not uniform in size or character.
URINE.	URINE.
Albuminuria with casts in about 50 per cent. of all cases.	Negative.

DIAGNOSIS OF TUBERCULOSIS IN THE NURSLING.—Hutinal and Tixier (*Ann. de méd. et Chir. Inf.*, June 1, 1912) find that a careful search of the conditions under which a child suspected of tuberculosis has lived will be of great value in diagnosis. The infection may be transmitted to the child before birth, during intrauterine life, or later. The laboratory and cutaneous reactions for tuberculosis are of value, and radioscopy may be of great assistance in diagnosis. Congenital tuberculosis undoubtedly exists, but is rare. Milk is an exceptional source of infection, according to the author. Almost always the infection reaches the child from his surroundings. The bacillus may be sought for in the stomach contents, feces, blood serum and cerebrospinal fluid. Enlarged lymph nodes may be shown by radioscopy when present.—*American Journal of Obstetrics.*

SOCIETY REPORTS.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Meeting, February 13, 1913.

HENRY D. CHAPIN, M.D., CHAIRMAN.

REPORT OF A CASE OF POLYMYOSITIS WITH MULTIPLE LIME DEPOSITS IN A BOY OF FIVE YEARS.

DR. SARA WELT-KAKELS presented this case. The family history of this patient is negative. In infancy he had blenorrhea neonatorum and whooping-cough, otherwise has enjoyed good health. His present illness began with depression, loss of appetite and a tendency to sit quietly in a corner; when the boy walked he did so on his toes. There was slight fever. Three weeks after onset of this condition a rash appeared almost over the whole body which disappeared in eight days. There was no exudation on the tonsils and the urine was negative. The lower extremities and later the forearms and hands became swollen. These swellings were exceedingly painful when touched. The child gradually lost the power of motion of his legs, arms, fingers, muscles of mastication and of the back. Some of the diagnoses made were encephalitis, with spastic paraplegia, juvenile dystrophy, acute articular rheumatism, etc. The orthopedists said it was a case of coxitis and placed the boy in a plaster cast, which was removed shortly by the parent. Massage improved the condition temporarily, but the swelling of the face remained. Three months after the onset of the disease the boy began to walk, and this improvement continued for about a year. In December, 1911, the child had a slight attack of measles. In January, 1912, a slight relapse of the original affection became evident. For the first time there appeared a swelling of the left hand with a purple discoloration especially prominent in cold weather. In September, 1912, a similar swelling appeared on the right hand.

Status Praesens.—Face edematous with a slight flush. Fundi and mucous membranes of mouth normal. Temperature between

99½° and 100° F. Anterior and posterior glands of neck, as well as the occipital and axillary glands, are slightly enlarged. Spleen slightly enlarged. Muscles slightly atrophied, motions free, except those of the hands. Bone intact, reflexes normal. Pirquet negative the first time, two weeks later positive. Wassermann for blood and spinal fluid negative. The X-ray shows a very rare and peculiar condition of lime deposits between the intercarpal bones. Chemical tests show that the patient is retaining calcium and magnesium salts in the body and these are probably being deposited in the tissues having the least resistance, namely, those of the hands.

Dr. Soresi presented a boy about six years of age in whom transfusion had been done through the external jugular vein. The boy was in a deplorable condition after an empyema and transfusion increased the hemoglobin from 30 to 75 per cent.

REMARKS ON THE ETIOLOGY OF HEMORRHAGE IN THE NEWBORN.

Dr. Oscar M. Schloss:

When one considers the comparative frequency of hemorrhage in the newborn and the number of years that these cases have been recognized, it is rather disappointing that we should know so little as to the actual cause.

I shall attempt to give merely a brief resumé of our present knowledge of the most important factors concerned in the causation of the so-called hemorrhagic disease of the newborn.

Among the earlier writers hemophilia was considered a frequent factor, but further study has shown that very few cases are of such origin. There is a small group of cases, however, in which hemophilia plays an important rôle. In these cases there is a definite family history and, in case of recovery, the child remains a bleeder in after life.

The many cases of hemorrhage in the new-born are due to bacterial infection there seems little room for doubt. The evidence for this view is both clinical and the result of postmortem investigation.

A great number of different organisms have been described as the causative agency in hemorrhage in the newborn. In some instances the bacteria have been the pus cocci and the cases have been clinically ones of pyemia, septicemia or hemorrhagic septicemia. Babes, Lubarsch, Gärtner, Mapes and many others have isolated special hemorrhage-producing organisms which caused hemorrhagic forms of septicemia when injected into animals.

The fact that a great number of the organisms described have been discovered on postmortem examination serves as the basis for legitimate doubt in reference to some of the findings. The cultures in many instances were made from twelve to thirty-six hours after death, and it seems quite possible that the micro-organisms grown were merely postmortem invaders.

It seems highly important that intra vitam blood cultures should be made in these cases, for it is only by this means that we can obtain a true estimate of the importance of bacterial infection.

That the absence of the clinical picture of septic infection is not of sufficient negative value to exclude a bacterial cause is beautifully demonstrated by 2 cases recently observed by Dr. Commiskey. The first patient began to bleed from the bowel on the day after birth. The hemorrhage continued despite all treatment and death occurred on the third day. The autopsy showed intestinal hemorrhage, myocardial hemorrhage and hemorrhagic vegetations on the tricuspid valve. At no time was the temperature above normal nor was there any sign which could be attributed to bacterial infection.

The second infant began to bleed from the cord on the third day and died on the day following. The hemorrhage was not profuse and it was obvious that the infant did not die from loss of blood. The autopsy disclosed the lesions of congenital syphilis and hemorrhagic vegetations on the mitral and tricuspid valves of the heart. Cultures from the heart's blood gave growths of a capsulated diplococcus, probably the pneumococcus. During the life of the infant there was no fever nor any physical evidence of septic infection.

The specimens from these 2 cases were shown.

The relationship of congenital syphilis to hemorrhage in the newborn has given rise to considerable discussion. Some writers believe that congenital syphilis is of etiologic importance only by predisposing to bacterial infection, others believe that it can be the direct cause. Time does not permit a discussion of controversial opinions, but the work of Mrâcek and others demonstrates that congenital syphilis may cause vascular lesions, that this disease is frequently accompanied by hemorrhage, and in some instances is the only determinable factor.

In addition to these general diseases there are certain local causes of hemorrhage in the newborn, the most important of which are gastric and duodenal ulcers. These ulcers may be small and multiple or large, single and of the variety found in adults. The ulcer described by Landau was 8 x 6 mm. in size. In several instances examination of the base of the ulcer disclosed the eroded vessel which gave rise to the bleeding.

Aside from the anatomic changes which have been mentioned, it seems only rational to believe that the ultimate cause of all hemorrhage is some pathologic condition of the blood or vessels or both. In approaching this conception of hemorrhagic disease one is confronted at the very outset by a formidable obstacle in the fact that there are a number of factors in normal blood clotting which are imperfectly understood. Reduced to its simplest terms the coagulation of the blood represents the action of thrombin or fibrin ferment on fibrinogen in the presence of calcium salts to form fibrin. The fibrinogen exists in the circulating blood as such; thrombin exists as prothrombin. Time does not permit a discussion of the theories of the activation of prothrombin, but Marawitz and others believe that this involves the action of an activating agency or thrombokinase. Howell, on the other hand, believes that thrombin is a definite chemical substance and not a ferment at all and that the function of the so-called kinase is to absorb antithrombin from the blood and not to activate prothrombin.

Obviously, pathologic hemorrhage may be due to a deficiency, absence or interference with the action of any of the elements entering into blood coagulation.

The blood has been examined carefully in very few cases of hemorrhage in the newborn and these examinations have not given constant results. As determined by the ordinary clinical methods in some cases the coagulation of the blood is greatly delayed or absent, while in others it is entirely normal. On the basis of our present knowledge the cases may be divided tentatively into three groups.

In the first group the coagulation of the blood is greatly delayed or absent. There is present a general hemorrhagic condition and a skin injury gives rise to continued bleeding. In two such cases in which the blood was examined by Dr. Commiskey and me there was a great deficiency or absence of thrombin. The blood from a similar case was very carefully examined by Whipple, who found that there was an absence of thrombin. In another case in which we examined the blood coagulation was delayed, but the striking feature was the softness of the clot. In this case the blood contained a deficiency of fibrinogen.

In a second group of cases blood coagulation is little, if at all, delayed, but there is continued hemorrhage from skin injuries. In these cases there is apparently an incomplete clot formation or a defect in clot retraction. In these cases, also, there is a general hemorrhagic condition.

In the third group there is no delay in coagulation time and clot formation is apparently complete. Moreover, there is no bleeding from skin injuries, the surface of which is quickly covered by a normal, well retracted clot. It seems obvious that these cases are not dependent on a generalized hemorrhagic condition, but are probably due to some vascular lesion which is localized in the areas from which the pathologic hemorrhage occurs.

In all cases of hemorrhage it seems probable that the vessels play an important rôle, but we are not in a position at present to determine the exact lesions.

The most important factors concerned in the etiology and pathology of the so-called hemorrhagic disease of the newborn may be summarized as follows:—

In a small number of cases, hemorrhage in the newborn is due to hemophilia.

Many cases are due to bacterial infection.

Congenital syphilis may be a cause of hemorrhage in the newborn.

In some cases the hemorrhage has been due to gastric or duodenal ulcers, the etiology of which is not definitely known. There remains a group of cases in which none of these factors are evident and in the absence of an adequate explanation at present it seems proper to attribute them to some primary pathologic condition of the blood or vessels.

The blood shows no constant pathologic change in hemorrhage in the newborn.

A consideration of the varying factors in the causation of these cases forces the conclusion that the hemorrhage is merely a symptom to which there exists a special predisposition during the first ten days of life. On the other hand, if there is a uniform pathologic condition common to all cases, this condition is at present unknown.

MORBID HEMORRHAGIC DISEASES OF INFANCY AND CHILDHOOD.

Dr. Angelo L. Soresi read this paper. (See p. 252.)

DISCUSSION.

Treatment of Hemorrhagic Diseases by Injection of Human Serum.

Dr. Roger H. Dennett.—The first case in which I used human blood serum was one of a hidden meningeal hemorrhage in a child six days old in whom symptoms appeared on the third day. The infant was moribund and in an extremely bad shape. In six to eight hours after the injection the entire condition had changed as described by those using transfusion. After the second injection the child began to nurse. Lumbar puncture on the second day showed that no further hemorrhage had taken place. This is one of those desperate cases which are oftentimes cured by the injection of human blood serum. Transfusion has two advantages. (1) Cessation of bleeding occurs, and (2) an addition of new blood is made. The same effect is produced in very severe cases, perhaps because the infant has the ability to form new blood readily. The more Dr. Welch has used the serum the more does he favor the use of the serum four or five days after the hemorrhages have ceased. I saw a case in consultation in which death proper was due to the fact that injections were discontinued after hemorrhage had ceased. On the fourth day there was a severe recurrence and the child died. It is evident that the use of human blood serum and transfusion will not cure hemorrhage due to syphilis or septic infections. We need not expect transfusion or human blood serum to act as a panacea in all hemorrhages of the newborn. We must use either transfusion or serum until we have a better classification. Dr. Soresi has become very proficient in transfusion work, but the rest of us have no opportunity of doing it as he does it. In answer to a question on the use of horse serum, the latter may bring on serum sickness because of the large amounts that have to be used and therefore cannot be recommended. Hemorrhage from circumcision may be helped by serum and transfusion as well. As to the advantage of whole blood or serum, I will say that the serum has little or no advantage over the blood itself. It takes three to four hours for the blood to coagulate and separate into serum and clot. Ten c.cm. of blood can be drawn and used directly to save time. Four, five, or six ounces are easily taken from the vein of a donor and the serum obtained can be kept or used for forty-eight hours. When using blood a donor must be procured every time. I use whole blood for first injections and then serum.

By Injection of Whole Blood.

Dr. L. J. Commiskey.—Whole blood was first used as a means of treatment of hemorrhage in the newborn by Dr. Schloss in April, 1908. Since that time 21 such cases and 2 cases of hemorrhage in older children have been treated by this method.

Of the 21 cases of hemorrhage in the newborn, 15 recovered and 6 died. Of the 2 cases of hemorrhage in older children, one a case of bleeding following the extraction of a tooth and the other an infant suffering from erythema nodosum who developed a purpura hemorrhagica and bled from the mucosa of the mouth; both recovered. These statistics include all cases and all types of bleeding and comprise ones which were practically moribund at the time treatment was instituted. Among the fatal cases were several infants who died, not as a result of hemorrhage, but of an underlying septic factor. One infant, for example, had been bleeding for eight days when admitted to the hospital and died three and one-half hours later, having received only a single injection of 10 c.c. of blood. We feel that we could with propriety exclude such cases, but an accurate estimate of the value of any therapeutic measure can only be made by the results from all cases.

The blood was usually taken from a vein of the forearm by means of an exploratory syringe and was injected immediately into the subcutaneous tissues of the infant's back before the blood had time to clot. The blood was usually obtained from one of the parents or relatives. The advantages of whole blood are that it can be easily and quickly obtained, can be used immediately and requires no complicated apparatus.

Since hemorrhage in the newborn is due to different pathologic conditions it seems an advantage to inject the unchanged blood, which contains all the elements essential for coagulation. The use of whole blood has been objected to on hypothetical grounds, that the cells must be broken up and excreted and, in consequence, an extra strain put upon the organism. From practical experience, however, this objection is of no real importance. The blood is quickly absorbed—usually in from two to four hours—and for some reason does not coagulate in the tissues.

In no instance has there been any harmful influence. Injections of whole blood have been given to feeble premature infants with a decidedly beneficial effect. We also gave injections to a number of extremely marantic infants; the pulse, temperature, respiration and weight were carefully watched and the urine examined. In no instance was there any deviation from the previous condition.

On the surface the statistical results obtained with this method are not striking, but, as I have mentioned, they include fatal cases in which the treatment was not given a fair trial and which might have been excluded. In a number of cases which recovered the hemorrhage was of a very severe type and the results after the use of whole blood were most convincing.

There are certain cases of hemorrhage in the newborn in which it seems scarcely conceivable that any ordinary therapeutic measure can promise much hope. For example, it seems improbable that the injection of blood or serum or even transfusion can influence the cases of generalized bacterial infection, as illustrated by the specimens shown by Dr. Schloss. As a matter of fact, several cases treated by transfusion have terminated fatally. There is also a type of case with profuse and, as a rule, rapidly fatal hemorrhage in which no treatment except an immediate transfusion can offer any probability of success.

In some of our earlier cases we believe that the quantity of blood used was entirely too small, and from further experience it seems that the best results can be expected from the injection of 20 to 30 c.c. to be repeated every six to eight hours as long as the hemorrhage continues.

If it is true, as is believed at present, that human blood or its derivatives are of value in the treatment of hemorrhage, it seems only rational to assume that transfusion is the ideal procedure. The disadvantage, however, is that transfusion requires a great degree of surgical skill which cannot be obtained at all places and at all times. In the majority of cases which are not of the rapidly fatal type it would seem preferable to use whole blood as the initial treatment and continue its use if beneficial; if after a fair trial, however, the hemorrhage is not controlled an immediate resort to direct transfusion would be indicated.

By Direct Transfusion.

Dr. H. H. M. Lyle.—In one case of pernicious anemia transfusion was tried. The microscopic picture showed that the red blood cells of the donor were eaten up by the phagocytes of the recipient. Fifty per cent. of the phagocytes contained red blood cells. This case is a warning not to use transfusion in pernicious anemia. The use of serum and whole blood has reduced the indications for transfusion. In hemorrhagic conditions they should be tried first because of the simplicity of the method. Transfusion may or may not be simple in some hands. It is not as simple as Dr. Soresi would have us believe.

We are improving on the method all the time. Very few can use the suture method. Crile's tube gives good results and now we have the Elsberg improvement. Dr. Soresi's instrument is ingenious. However, I do not use it myself, although it is probably easier to use than Crile's. For transfusion we must develop a simpler and more accurate method. In small children, where we get a rapid hemorrhage and although we bring the child out of shock it succumbs, it is of the utmost importance to transfuse the blood rapidly. The question is, Can the blood be taken directly from the vein and plunged into the vein of the child directly and rapidly? Enough blood should be given in cases of hemorrhage of the central nervous system. This will save a few children that would otherwise be lost. In Bellevue Hospital I believe paraffin needles are used for the puncture. Reports on the use of saline solution in these cases are being published. The use of 20 c.c. to 30 c.c. of blood and albolene plunged into the ends of bones to encourage union in ununited fractures keeps the blood fluid for a long time. A method similar to this may be developed in the case of children where rapid transfusion is required. Whether the albolene will act as a foreign body and cause embolism is not known.

Dr. Alfred F. Hess.—There is no doubt that many of the cases of hemorrhage are due to bacterial infections of which the blood cultures should give an accurate picture. There have been positive blood cultures after severe bleeding. In the second case cited by Dr. Schloss with congenital syphilis there was a positive blood culture. It is questionable whether this positive blood culture was not a contaminated specimen, the bacteria entering the blood after the hemorrhage. I recall a case of marked bleeding with autopsy where transfusion had been unsuccessful. The child died of oozing from the nasal mucous membrane and the autopsy was absolutely negative. In another case with a positive Wassermann where horse serum had been used the findings at autopsy were absolutely negative, with no signs of a bacterial infection.

Dr. Schloss.—In regard to Dr. Hess's suggestion on postmortem infection of the blood it is a thing that we have to keep in mind in the blood cultures of autopsy material. It is then a purely accidental occurrence. In the case I cited the infant had distinct endocardial vegetations and the organism obtained from them is capable of producing this condition. For that reason we regarded it as the etiologic cause.

I would like to mention 2 cases of Dr. La Fétra's which he could not be present to report. The first, an infant one and a half days old, began to bleed from the intestines and also vomited a large quantity of blood. It was brought to the hospital in great prostration, pulse rapid and hardly palpable. The respirations were rapid and infant did not respond in a normal way. Thirty c.cm. of normal blood were injected and the next day hardly any blood was passed. Forty c.c. were then given. From this time the bleeding stopped completely. Gain in weight was continuous and improvement rapid. Three weeks afterward 30 c.c. of whole blood were given with very good result. The second case concerned a boy of seven, who had hemorrhages into the skin and intestines. Blood serum injections were made with no result. Transfusion was tried and the improvement was only temporary. In a few days bleeding returned. Then the child was treated by whole blood injections. Child improved, hemorrhages disappeared. Later there was a recurrence, the treatment was renewed in the same way and the condition cleared up again permanently.

Dr. Soresi, in reply to discussion, said: I do not object to the use of serum. It should be tried and must be continued for a few days. An immense amount of blood is required; 800 c.cm of blood is required to give 500 c.cm of serum, a not unusual dose. In children an improvement or cure can be brought about with a few drops of blood. The transfusion can be stopped in about a minute. The injection of full blood is not without prestige. It is one of the oldest procedures and was used before the days of asepsis. In an old catalogue preserved in Paris you can see the pictures of the instruments used. The elements of the blood are liable to be injured by anything that you may do to them. In a recent number of the *Journal of American Medical Association* a new method is described where a simple hypodermic syringe was used for the transfusion in an emergency case. The child's life was saved and the authors hope to popularize the method. I must insist upon the fact that transfusion is easy. It takes only a few minutes to anastomose the jugular vein. I invite any of the gentlemen to my laboratory, where they can see for themselves how very easy the method is. Dr. Carrel has invented a new cannula for this purpose. He recognizes the use of the radial artery in this connection and also transfuses blood from the vein in the leg. This, in my opinion, is a mistake, because in severe hemorrhage and shock you have an accumulation of blood into the abdominal organs, and if you inject blood through the veins of the leg it flows into the abdomen and you endanger the life of the patient. If the jugular vein is used for the transfusion the blood drops into the heart, shock is overcome and the flow can be regulated by pressure on the vein. Transfusion in pernicious anemia should not be done. It is a pity to spoil good blood in trying to improve the bad. We are not dealing with a primary disease, but a faulty metabolism. I have been guilty of this error five times.

Horse serum can be used when nothing else is obtainable and when the patient is seen in the very beginning of the disease. Cases of hemolysis have been reported and, therefore, horse serum has been abandoned. In regard to circumcision, a case has been reported from San Francisco where the injection of serum and also saline solution were of no avail. A transfusion of blood stopped the hemorrhage in two hours and the child has been well since. To prevent dilatation of right heart slight compression must be exerted on the vein of the donor and thus the amount of blood can be regulated.

Cardiac Irregularities in Childhood.—H. H. Turnbull (*Australian Medical Journal,* April 20, 1912, p. 444) says that the appearance of extrasystoles, single or multiple, in the child, whose heart normally fails to show them, strongly suggests that at the spot from which the beats arise there is an area of myocardial change; and therefore the child should be closely watched and its progress followed with especial care until the extrasystoles disappear, as they seem to do in a week or a few weeks, or until it is certain that the heart can perform satisfactorily the work allotted to it. If the irritability increases and the heart fail to gain strength for its proper work, active progressive myocardial involvement is probably present, and the prognosis is serious.

CURRENT LITERATURE.

ABSTRACTS IN THIS NUMBER BY

DR. JEROME S. LEOPOLD. DR. CHARLES E. FARR.
DR. RICHARD M. SMITH. DR. WM. A. MURPHY.
DR. ROGER H. DENNETT. DR. J. HERBERT YOUNG.
DR. C. D. MARTINETTI.

PATHOLOGY.

BEYER, WALTER: DIPHTHERIA BACILLI IN THE URINE. (*Münch. Med. Woch.,* February 4, 1913, p. 240.)

Conradi and Bierast found diphtheria bacilli in the urine of one-third of the diphtheria patients examined. Beyer examined the urine of 19 diphtheria patients and found diphtheria bacilli in every case. In 3 cases the urine was positive eight weeks after the beginning of the disease, and in 1 case ten weeks after. One patient, who was a carrier, also showed the presence of the bacilli in the urine. It was not possible to make the bacilli disappear from the urine with urotropin treatment.

These findings clearly show that diphtheria is a bacteremia. Although patients are a source of infection as long as bacilli appear in the urine, according to Beyer, it would not be practical to isolate these patients until the urine is free from bacilli.

JEROME S. LEOPOLD.

WOLLSTEIN, MARTHA, AND MORGAN, EDWARD: BLOOD CULTURES DURING LIFE IN INFANTS AND YOUNG CHILDREN, WITH DESCRIPTION OF A NEW TECHNIQUE. (*American Journal of Diseases of Children,* October, 1912, p. 197.)

Blood was obtained for culture from the external jugular vein. By using this vein no difficulty was encountered in securing sufficient blood for examination. Thirteen cases of lobar pneumonia were studied and four of these showed pneumococci in the blood before the crisis. Twenty-six cases of bronchopneumonia showed positive cultures in 6, 4 pneumococci and 2 streptococci. Fourteen cases of empyema showed 9 positive cultures. Other positive cultures were obtained in meningitis, endocarditis and erysipelas and furunculosis. RICHARD M. SMITH.

SURGERY.

STRONG, R. A.: MASTITIS FROM A PEDIATRIC STANDPOINT. (*New Orleans Medical and Surgical Journal,* November, 1912.)

A mother was nursing her infant, two months of age, who had gained 3 pounds since birth. Vomiting and other digestive disturbances, with a sudden onset, occurred, and was at first thought to be due to irregular feeding periods and over-feeding. The mother's milk was set aside and found to have sediment which, upon microscopic examination, proved to be pus. There was some pain in the right breast, but no evidence of localized or general inflammation and very little tenderness. The nipples were sterilized and after withdrawing about one-third of the milk from the breasts the middle milk was planted on blood serum, with the result that there was no growth after incubating for twenty-four hours. It was then replanted on agar, and after a second twenty-four hours there was a small growth of staphylococcus pyogenes aureus, and a Gram negative diplococcus, which he stated was possibly micrococcus catarrhalis. The child was taken off the breast, and its gastric symptoms disappeared. After two weeks the culture of the milk was negative. The mother's absence of general septic symptoms was explained by the theory that the pus was draining freely from the ducts.

ROGER H. DENNETT.

PERTHES, G.: BONE AND JOINT TUBERCULOSIS. (BEHANDLUNG DER KNOCHEN UND GELENKTUBERKULOSE.) (*Therapie der Gegenwart, Berlin,* December, 1912.)

The author believes in Bier's hyperemia in the treatment of bone and joint tuberculosis, although he has never obtained as good results as Bier himself. He thinks the use of potassium iodid, internally, in addition to the usual treatment, promises much better results. In this way the hyperemia can be continued up to twelve hours per day, the iodid being given freely from 1 to 8 gm. per day. Although operative wounds in children heal more kindly than in adults, the results of resection are bad. Resection of the knee, however, gives better relative results than in the hip or wrist, where non-operative measures are especially indicated. A study of the general condition of the patient and his ability to undergo a long and tedious course of treatment, and the use of the X-ray, are of great value in determining whether operative measures should be undertaken.

CHARLES E. FARR.

RIXFORD, EMMET: CONTRIBUTION TO THE ETIOLOGY OF CONGENITAL DISLOCATION OF THE HIP. (*Annals of Surgery,* December, 1912.)

Rixford was especially fortunate in obtaining two specimens of congenital dislocation of the hip in newborn infants. He presents a careful study by X-ray, photographs, etc., of the anatomy of the joints, and enters into a careful discussion of the etiology of this condition. Congenital dislocation is a very common condition and is frequently combined with other deformities, such as club foot, spina bifida, etc., but the author believes that many of these and probably the hip-joint condition itself are caused by intrauterine pressure. In his cases there were many evidences of excessive intrauterine pressure, particularly on the knees and feet, and this apparently by leverage through the femur, had caused stretching of the upper portion of the hip-joint capsule. He thinks possibly the final force in causing the vertical displacement may be in the fetal movements, such as extension of the pelvis in utero. The diagnosis of congenital dislocation should be more frequently made in infancy, and Rixford says that the mobility of the flexed femur upon the pelvis in the horizontal plane is a valuable aid in the diagnosis, although he is not at all sure that treatment at this early age would be of much avail.

CHARLES E. FARR.

RUSSELL, JAMES I.: TRAUMATIC SEPARATION OF THE LOWER EPIPHYSIS OF THE FEMUR. (*Annals of Surgery,* December, 1912.)

Russell reports 208 cases of separation of the lower epiphysis of the femur from the literature, and gives the details of one personal case. A boy, aged five, was caught in the spokes of a wagon wheel and the epiphysis wrenched from the shaft of the femur. The displacement was at the outer side. The X-ray confirmed the diagnosis of epiphyseal separation and operation was found necessary to reduce the fragments. The result was a complete return to normal with the exception of a slight genu valgum. The predisposing causes to epiphyseal separations are syphilis, tuberculosis, rickets, etc., while the immediate cause is usually severe indirect violence. Hilgenreiner reports 47 cases caused by entanglement of the leg in the wheels of a wagon, 25 cases by hyperextension and flexion, 24 by direct injury, 8 from orthopedic operations. The conjugal cartilage generally remains adherent to the epiphysis and frequently takes with it small fragments of the shaft. Associated injuries of the vessels, the nerves and the joints are not uncommon; the separation is usually compound. The results of cases well handled in recent years have been good. Arrest of bone growth does not occur. Most of the simple separations can be easily reduced without operation, but the compound cases and the complicated ones require open operation. CHARLES E. FARR.

PUSSEP, L. M.: OPERATIVE TREATMENT OF INTERNAL HYDROCEPHALUS IN CHILDREN. (*Archiv. für Kinderhk.,* Stuttgart, December, 1912.)

Pussep has tried his method of trephine drainage in 18 children and 2 adults. The object of the operation is to drain the internal cavities of the brain into the epidural space. After the usual preparations the skin incision is made in the occipitoparietal region and the skull is trephined. A silver needle, 3 mm. in diameter and made up of three separate small tubes, is then inserted into the lateral ventricle. When the cerebral fluid is flowing freely the extra parts of the needle are removed, leaving the inner part *in situ.* The outer end of this tube is then bent at right angles and the dural flaps are brought down and sutured beneath it, thus allowing the tube to rise and fall with the movements of the brain in respiration. The scalp is then sutured over the tube, which is left in place for several weeks until a natural passage has been formed. The results in the author's cases were quite favorable. CHARLES E. FARR.

KOCH, HERBERT: TUBERCULOUS MENINGITIS. (*Zeits. für Kinderhk.,* November 30, 1912, p. 354.)

There were 306 cases of tuberculous meningitis in the Children's Clinic from 1903-11, up to fourteen years of age. Sixty-eight per cent. were under five years. Only 3.7 per cent. during latter four-year period. The second year of life shows the greatest absolute number of cases of tuberculous meningitis. In comparison, meningitis is found in the first year of life in 40 per cent. of all cases; second year, 58 per cent.; third year, 78 per cent. Only 23 per cent. showed hereditary taint from parents. There is no definite family tendency to tuberculous meningitis. Of 302 cases there were 145 boys and 157 girls, *i.e.*, no sex predilection.

Eighty-two per cent. were breast-fed, while 18 per cent. were bottle-fed, about normal percentage of all children. Six children developed the disease while yet nursing.

Infectious Diseases.—One hundred and twenty-nine of the 305 had had measles—60 in the preceding year, 21 during the previous four months. In 10 cases there seemed an immediate sequel to measles.

Pertussis was the only other infectious disease having any relation, 6 cases having had it within four months and four of these were in direct continuity.

Clinically recognizable tuberculous disease preceded the meningitis in only 49 cases, of which 23 were positively diagnosed during life.

Trauma was given in the history as etiologically important in 13 cases, but only in 6 did it appear possible at postmortem. In 2 of the 6 the postmortem showed apparent real connection of the trauma to the disease.

In nearly every case was a primary focus present in the lung, with corresponding lymph node involvement. In 162 cases there were, moreover, other chronic but active lesions. In no case was a positive primary lesion found in the intestine.

In 2 cases only were no old active lesions found, but only calcified or encapsulated spots in lungs or nodes.

In conclusion, tuberculous meningitis does not occur when the old process is encapsulated. CHARLES E. FARR.

BEITZKE, PROF. DR. H.: ENTRY POINT FOR TUBERCULOSIS. UNTERSUCHUNGEN UBER DIE INFEKTIONSWEGE DE TUBERKULOSE.) (*Virchow's Archiv.*, 1912, Bd. 210, p. 173.)

The author examined the regional and visceral nodes of children from one to fifteen years, who presented no gross anatomic lesions of tuberculosis.

The methods used were the microscope, antiformin and animal experimentation. From all the enormous material of the Berlin Pathological Institute, only 31 suitable cases were found, and in only 27 could the experiments be fully carried out. Of these, 18 were negative in every way for tuberculosis, leaving 9 only for complete analysis.

These 9 ranged in age from one year and four months to ten and one-half years, and died of various non-tuberculous complaints. In 6 of the 9 one or more groups of nodes were hyperplastic, but this bears no constant relation to the tuberculosis.

Of the 9 cases, 4 showed tuberculosis in the cervical nodes alone and 1 showed tuberculosis in the tracheal nodes alone; 2 showed tuberculosis in cervical, tracheal and mesenteric nodes, 1 in periportal and axillary, 1 in periportal and tracheal nodes.

Thus the search was positive, of the 9 cases, six times in the cervical nodes, four times in the tracheal, twice each in the mesenteric and periportal, once in the axillary and none in the inguinal nodes. The number of cases is too few to draw conclusions from, but is very suggestive.

The author concludes that an hematogenous infection with tubercle in childhood, during the latent stages, does not occur, or, at least, rarely, under exceptional circumstances, and that an isolated tuberculous process in the respiratory or digestive tract shows with great certainty the point of entry. He believes that the intestinal tract is early rendered non-sensitive to infection by the myriads of intestinal bacteria, and that the reverse holds true in the respiratory tract. CHARLES E. FARR.

MEDICINE.

UNGER, L.: ICTERUS NEONATORUM. (*Zeits. für Kinderhk.*, November 16, 1912, p. 312.)

Unger says that the idea that icterus neonatorum is a physiologic process must be modified. In past years reports from the French literature showed that icterus neonatorum occurred in from 90 to 100 per cent. of all infants. In modern times in modern hospitals, where perfect asepsis is carried out during delivery, icterus neonatorum occurs in less than 30 per cent. of cases. Among Unger's cases, which number 3,856 infants, from Wertheim's obstetrical clinic in Vienna during the year 1911, only 782, or 20.2 per cent., had icterus neonatorum.

Unger considers this disease of hepatogenous and not hematogenous origin. He discusses very thoroughly the various theories of this condition. It is not a physiologic process, as most authors believe, because only about one-fifth of all his observed infants had the disease. Also because two-thirds of his cases lost a good deal of weight, and because the outcome is not always favorable. Unger agrees with Czerny-Keller, who says this condition is due to some infection.

The symptoms which Unger observed among his cases were diarrhea—sometimes twenty or more movements a day—vomiting, colic, meteorismus, great restlessness and at times somnolence. At times there was a rise in temperature.

The jaundice never appears first in the sclera, as in adults, but is first seen on the skin of the face and the buttocks. The soles of the feet and the palms of the hands are only affected in severe cases. The sclera is also only involved in very severe cases. Concerning the prognosis of so-called icterus neonatorum, Unger says that this is by no means a physiologic process. Most of the cases are mild, but one can never tell what the outcome may be. Treatment consists in giving warmth to the infants and frequent intervals of feeding. Breast milk is very important. If there is vomiting feeding should be given with a spoon or by gavage. For the diarrhea rectal irrigations of salt solution are recommended. If the vomiting is severe, belladonna should be given. JEROME S. LEOPOLD.

BENDIX B., AND BERGMANN, J.: ON THE SO-CALLED "SALT FEVER." (*Monats. für Kinderhk.,* December 6, 1912, p. 387.)

Bendix and Bergmann have again taken up the subject whether or not there is such a thing as salt fever. In 1911 a publication appeared (Wechselmann) which showed that the fever which appeared after the intravenous injection of salvarsan could be avoided if a salt solution was used which was aseptic and free from bacteria toxins. Bendix and Bergmann considered that the fever which resulted in infants after saline injections could be avoided if a solution was used which was free from these toxins. Accordingly, a solution was used of water recently distilled, and in no case were the authors able to observe a rise in temperature after injection. If the water was not freshly distilled (within a few hours) frequent rise in temperature was seen. These results coincide with those of Samelson published some time before. (*Monats. für Kinderhk.,* 1912, p. 125.) Every infants' ward should therefore have its own distillation apparatus if saline infusions are to be given. JEROME S. LEOPOLD.

DOCK, GEORGE: DEFECTIVE DEVELOPMENT FROM ARTHRITIS IN EARLY LIFE. (*American Journal of Medical Science,* October, 1912.)

As chronic arthritis is rare in children many details are not as thoroughly known as is desirable. Since Ollier demonstrated that injury to epiphyseal cartilages retarded growth many indications of more complicated nutritional changes from similar causes have been observed.

Reports a case, aged twenty-four years, with history of arthritis, without heart lesion at eleven years, slight retardation in development, especially of long bones and shortening either relative or absolute of bones of extremities. First admission to hospital, in 1900, with diagnosis of arthritis deformans; again admitted 1901, for seven months, same diagnosis; discharged "improved." Father died of rheumatism at thirty-one years of age; also one brother had an attack of rheumatism.

Physical examination showed nearly all joints stiff, muscles small and weak, frame juvenile, body hair and external genitals well developed. Radiograph showed rarefactions common in chronic arthritis, change in shape of heads of long bones, shafts thin and slender, phalanges have cupping and broadening of the articular surfaces and narrowing of shafts suggestive of achondroplasia.

WM. A. MURPHY.

JORDAN, WALTER R.: A CASE OF RHEUMATOID ARTHRITIS IN A CHILD. (*British Journal of Children's Diseases,* November, 1912.)

A boy, aged six years, with early symptoms of this condition was treated in the hospital for six weeks with salicylate of soda, with apparent cessation of all symptoms except a slight variation of temperatures, varying from 1° to 2° F. After his discharge no active treatment was kept up. Ten months again came under observation; marked muscular wasting and involvement of many joints to the point of ankylosis had developed. Temperature and pain again subsided with use of the salicylates, however, showing a tendency to return whenever treatment was suspended even after six months. The author believes that steady treatment persisted in from the first "the ankylosis and deformities might have been avoided or much lessened."

WM. A. MURPHY.

JEMMA, R.: THE ANEMIA OF LEISHAMANIASIS. (L'ANÉMIA PAR LEISHMANIA.) (*La Ped. Prat.,* November 5, 1912, p. 542.)

The anemia due to Leishman corpuscles is an infectious disease found on the shores of the Mediterranean. It is found principally in children from one to three years of age, and is characterized by fever, anemia, progressive enlargement of the spleen and emaciation. The cause of the anemia is a parasite identical with that described by Leishman and Donovan in kala-azar. Although a few cases have been reported as cured, the disease is usually fatal. The parasite is found in abundance in the spleen, liver and bone marrow. It is round or oval in form, from 2 to 5 μ in diameter, with a round nucleus and granular cytoplasm. The disease is believed to be transmitted from the dog to man by means of the flea. Clinically there are three types—an acute form, lasting from thirty-five to forty days; a subacute form, lasting from five months to a year, and a chronic form, lasting three years or longer. Diagnosis is impossible unless the parasite is found. The method employed is puncture of the spleen and examination of the splenic pulp. The blood shows a low hemoglobin, an oligocythemia and, above all, a leucopenia. The treatment consists principally in prophylactic measures and general hygiene. All the drugs so far employed (salts of quinin, atoxyl, iodin, mercury, salvarsan) have given negative results.

J. HERBERT YOUNG.

SWIFT, HOMER F., AND ELLIS, A. W. M.: THE INTENSIVE TREATMENT OF SYPHILIS. (*Journal of American Medical Association,* October 5, 1912.)

In latent syphilis within three years of time of infection 75 per cent. show a positive reaction, in late latent cases with two years' treatment or less 58 per cent. are positive, while 40 per cent. of patients treated from two and one-half to six years give a positive Wassermann. Considering these figures it is probably safe to conclude that 50 per cent. were insufficiently treated. From Gemurich's series it would seem that with a given amount of treatment there is more than twice the liability of relapse if treatment is delayed until the serum reaction is obtained. If delay in beginning treatment until secondary stage the difficulty and time of cure are increased threefold.

The use of salvarsan alone has resulted in a large per cent. of relapses. Intravenously its action is rapid, but not continuous, and hence repeated injections are necessary. A reliable rule is four or five intravenous injections of from 0.3 to 0.5 gram at intervals of from five to seven days, combined with, or followed by, a course of insoluble mercury intramuscularly. After mercury salvarsan should again be repeated. The alternative gives a most intensive treatment with little danger of an accumulative action.

In the year 1910 half the general paralysis of the insane of the state was furnished by the Island of Manhattan. This would seem to be a great argument for the proper observation and treatment of early cases in hospitals, an impossibility at present, since a majority of New York hospitals do not admit the patients suffering with the disease. WM. A. MURPHY.

WIELAND, E.: ON HYPOTHYRECTIC CONSTITUTION AND EARLY ACQUIRED ATHYREOSIS. (*Kassowitz's Festschrift,* 1912, p. 367.)

In order to express one's self more clearly one should do away with the old terms of *myxedema* and *cretinism* and, according to Kocher, use the terms *athyreosis* and *hypothyreosis.*

We should use the term *athyreosis* if the thyroid gland is completely missing and *hypothyreosis* if the functional defect is only a partial one. At times it will only be possible to tell by autopsy which condition is present. Athyreosis is usually easily recognized during the first six months of life, while hypothyreosis can only be diagnosed later on.

In childhood acquired forms of thyroid insufficiency are very uncommon. Weiland reports a case in a man thirty-eight years of age who was observed for the first time twelve years ago. This case is the oldest in the literature. The next oldest case reported by Bourneville was thirty-six years of age when he died.

Wieland's case was normal in every respect until eight months of age, when, after a fall, the typical signs and symptoms of "myxedema" developed. At twenty-six years of age, when the patient was first observed, he had the stature of a four-year-old child. He could sit but was unable to stand without support. The fontanel was closed. The facies was typical of myxedema. No thyroid could be palpated. The genitals were infantile. The ossification as shown by X-ray of the bones of the wrist denoted four and one-half to five years' development. His weight was 10 kilograms. After six months of thyroid extract treatment a marked improvement was noted. The patient had gained 3 kilograms in weight, and had outgrown his clothes and shoes. For the first time in his life patient walked across the room. After three years' treatment patient continued to improve in every way.

Patient was able to walk up and down stairs, and began to take an interest in life. His intelligence and power of speech did not improve. After six years' treatment no further improvement was noticed. During the past six years patient had refused all treatment and his condition remained the same. The ossification is that of a five-year-old child. In the region of the thyroid gland there is palpable a mass the size of a walnut which Dieland considers the degenerated remains of the thyroid gland which functionated until the patient was eight months old.

Pathologically, the condition may be due to a metastatic thyroiditis or a thyroid degeneration with total atrophy of the thyroid gland. According to Wieland this condition is one of those very rare cases of acquired athyreosis.

JEROME S. LEOPOLD.

RURÄH, JOHN: A BRIEF REPORT OF AN EPIDEMIC OF SORE-THROAT, WITH INVOLVEMENT OF THE CERVICAL LYMPH NODES. (*American Journal of Diseases of Children,* November, 1912.)

In 600 odd cases there were 28 fatalities. Complications were severe and numerous; 30 to 40 per cent. had otitis media, nearly as large a number had irregular swellings of the neck over the epiglottis, base of the tongue, etc., suppuration being unusual. Edema of the eyes was common, as was bronchitis and pneumonia as a complication; also gastrointestinal disturbances, 3 cases of erysipelas and involvement of tissues around the joints. A diplococcus, often in pure cultures, was isolated from a number of cases; had a distinct capsule, being Gram-positive.

Nearly 80 per cent. of the cases were using milk from one dairy, which had temporarily discontinued its customary pasteurizing of milk, the weather at this time being extremely cold.

WM. A. MURPHY.

CZERNY, A.: L'ANÉMIE D'ORIGINE ALIMENTAIRE. (ANEMIA OF INTESTINAL ORIGIN.) (*La Ped. Prat.,* November 5, 1912, p. 549.)

Czerny discusses the type of anemia seen in infants during the first year due not to insufficient food, but to feeding too long on an exclusive milk diet. The antecedent history of tuberculosis or syphilis, or the diet of the mother during pregnancy, seem to have no etiologic significance in the production of this form of anemia. The onset is insidious; sometimes enlargement of the spleen appears before the anemia. The blood shows a diminution in the amount of hemoglobin, a diminution in the number of red corpuscles, and no increase in the number of white corpuscles. Although the common explanation of this anemia is that it is due to a lack of iron, Czerny thinks this explanation alone is not sufficient. He believes that milk has an active and harmful influence on the blood-forming organs. The treatment is simple. A reduction in the amount of milk and the addition of vegetables, gruels, rice, tapioca and fruits to the diet is all sufficient. Iron is unnecessary. J. Herbert Young.

Comby, F.: Hemorrhagic Pleurisy in an Infant. (*Archiv. de Méd. des Enf.*, 1912, No. 2.)

Notwithstanding a very incomplete description the case of Comby is worthy of note. Hemorrhagic pleurisy in infants is extremely rare; in adults it is found in conjunction with neoformations of the lung and pleura. Autopsy revealed a tumor in the anterior mediastinal region of sarcomatous nature; probably originating from the thymus. An extensive pleuritic hemorrhage existed on the left side. Considerable dyspnea had been caused by compression of the trachea. C. D. Martinetti.

Simpson, J. W.: Incontinence of Urine in Children. (*Edinburgh Medical Journal,* January, 1913, p. 49.)

In ordinary healthy children control of the evacuations of the bladder should be acquired by the end of the second year. If by the end of the third year a child has not acquired this control, incontinence may fairly be said to exist. In the general treatment of simple incontinence, that is, one without any definite pathologic cause, Simpson recommends plenty of fresh air and a fair amount of exercise, and for highly strung children a change of air and scene. The child should pass water immediately before going to bed and two hours afterward should be roused from sleep and the bladder again evacuated. The amount of fluid should not be restricted during the day, but the last meal and fluid should be taken at least one hour before going to bed. Regular habits of urination throughout the day should be established and the child should be encouraged to retain the urine as long as possible. Raising the foot of the bed and placing something on the child's back to make lying on the side inevitable are procedures which, in Simpson's experience, have been of no value. In children with normal urine, after the general condition has been improved by a tonic, tincture of belladonna is given, beginning with 10 minims two or three times a day, and gradually increasing the dose up to 20 to 25 minims. Usually one does not need to prescribe more than 15 minims thrice daily, but it is advisable to continue this for a considerable period. When the urine is extremely acid the acidity should be reduced by the use of citrate of potash before belladonna is administered. If the urine is alkaline dieting is of the first importance, all carbohydrate food, as far as possible, being prohibited. If the urine is very alkaline acid sodium phosphate may be given. When the alkalinity of the urine has been reduced, belladonna should be used in the manner stated above. If there are bacilli in the urine urotropin is advised, preceded by the use of citrate of potash if the urine is very acid. If there is a mixed infection salol is often more efficacious, or a vaccine may sometimes be used with great advantage. After belladonna has been used unsuccessfully good results rarely follow from the use of other drugs, although ergot should be tried. Thyroid was frequently used, but the results obtained were disappointing. J. HERBERT YOUNG.

MCKENZIE. RHEUMATIC INFECTION AND OTHER INFECTIONS IN CHILDREN. (*British Medical Journal,* June 1, 1912.)

The author discusses the means by which children's joints may become infected and cites illustrative cases. The most important and most frequent path of entry is undoubtedly the throat. Usually it is by way of the tonsils, but may possibly be through the general lymphatic tissue. In certain instances the infection may gain entrance through the pulmonic mucous membrane, either in some localized area or general infection. The third portal of entry is the intestinal canal. He discusses the possibility of protecting against rheumatic complications and all diseases in these various localities by saying that the hypertrophied adenoid tissue in the throat and nasopharynx should be removed in the quiescent stage and that simple congestion of the pharynx in a child with rheumatic family history should be looked upon seriously and treated with salicylic acid preparations. Pulmonary infection should be treated by inhalations of creosote and carbolic acid. He believes intestinal infection may be benefited by the use of sodium salicylate combined with sodium bicarbonate and rhubarb powder. In many cases of rheumatic fever he was able to isolate the micrococcus rheumaticus.

RICHARD M. SMITH.

PHYSIOLOGY.

HESS, ALFRED F.: PANCREATIC FERMENTS IN INFANTS. (*American Journal of Diseases of Children,* October, 1912, p. 205.)

By the use of the duodenal catheter Hess was able to study pancreatic ferments in infants. Fluid was aspirated from infants varying in age from a few hours to a year. A considerable number of newborn infants were tested before they were put to the breast. The three pancreatic ferments were found in the intestine in these cases. During the first week of life the amount of pancreatic secretion is very scanty, but it contains starch-splitting enzymes with increased regularity. He was unable to demonstrate an increased strength of amylase when barley water was mixed with the milk or of lipase when the percentage of fat was increased. Some sick infants were tested. In marasmic children the ferments were not lacking. In some atrophic infants a large amount of thin, watery juice containing all the pancreatic ferments weak in lipase was found. It is suggested that the loss of alkali due to the outpouring of this secretion may constitute an important loss to the body. The condition is termed "paralytic hypersecretion." RICHARD M. SMITH.

HEIMAN, HENRY, AND BOOKMAN, SAMUEL, AND CROHN, BURRILL B.: STUDIES IN METABOLISM OF AMAUROTIC FAMILY IDIOCY. (*American Journal of Diseases of Children,* October, 1912, p. 234.)

In the study of the nitrogen, chlorin and phosphorus metabolism in 2 cases of amaurotic family idiocy the authors found that the absorption from the gastrointestinal tract and the retention within the body was normal for all constituents. Close scrutiny of the figures in intake and output of phosphorus and sulphur does not disclose a marked disturbance in the metabolism of these infants. When one takes into consideration the very slow process of degeneration and the small amount of sulphur and phosphorus in the entire cerebral system, it is possible that an abnormal elimination of these constituents would not be shown. It is advisable to study the disease at intervals during its course to determine, if possible, any abnormal conditions.

RICHARD M. SMITH.

THERAPEUTICS.

DUNZELMANN, ERNST: SALVARSAN AND NEOSALVARSAN IN THE TREATMENT OF CONGENITAL LUES. (*Zeits. für Kinderhk.*, January 18, 1913, p. 512.)

Dünzelmann's cases were treated in the Children's Hospital in Leipzig. Forty cases of congenital lues were treated—29 cases with salvarsan and 11 cases with neosalvarsan.

All but 4 cases were injected intravenously. One case was injected subcutaneously with a very severe necrosis resulting. Intramuscular injection was also given up on account of infiltration and necrosis. The best method of intravenous injection is with a 5 per cent. solution; 0.1 salvarsan was given in 2 c.cm. saline solution, freshly prepared, which was then made alkaline with NAOH. This solution was injected in a vein of the skull with a small glass syringe. The dose was 0.1 given five times.

All forms of congenital lues were treated. The infants were from four weeks to ten and one-half months of age.

After injection the skin eruption very quickly disappeared, and the general condition of the child improved very much. There was always noted after injection anorexia, malaise and drowsiness. Temperature was noted at times. Infants should not be injected while they have any rise in temperature.

A combined treatment of salvarsan or neosalvarsan with mercury seems the best method of procedure. Salvarsan and neosalvarsan have the same effect. Neosalvarsan is easier to give because it can be added directly to sterile water and then injected.

If an infant is suffering from enteritis or some infection of the respiratory tract it should receive mercury first, and then, after the infant's general condition has improved, salvarsan or neosalvarsan. All cases should be treated until cured, that is to say, until the Wassermann reaction remains negative, and all clinical symptoms have disappeared, including the enlarged spleen and the stubborn rhinitis. These cases should only be considered cured after no symptoms have reappeared for at least two years.

Dünzelmann concludes that Ehrlich's method has caused great advances in the treatment of congenital lues.

JEROME S. LEOPOLD.

SIMON, S. K.: IPECAC IN AMEBIC DYSENTERY. (*New Orleans Medical and Surgical Journal,* November, 1912.)

This is a report of the subsequent history of 15 cases of amebic dysentery, all of whom had been treated with large doses of ipecac six months to four years previous to the report. Some of the cases had had a dysentery for two or more years. Perfect symptomatic recovery resulted in every case. The stools were not always examined in the final report, but those that were examined showed no amebæ.

The full plan of treatment includes the following essentials: (1) Absolute rest in bed over a period of at least two weeks. (2) Diet, only liquids are allowed during the first week, preferably even to the exclusion of milk during the initial two or three days. There should be a restriction of the coarser foods, which leave residue for several weeks following the treatment. (3) Salol coated 5-grain pills of ipecac, of the best Rio variety, made fresh. The initial dose is 60 to 100 grains and each succeeding evening the dosage is reduced by 5 grains. A three-hour fast should always precede the administration of the pills. (4) No bowel irrigations are allowed.

ROGER H. DENNETT.

NICHOLSON, WM. R.: TREATMENT OF MELENA NEONATORUM BY HUMAN BLOOD SERUM. (*Therapeutic Gazette,* February 15, 1912.)

The author describes the condition commonly known as hemorrhagic disease of the newborn. He believes that the portal of entry for the infection which causes the condition is through the gastrointestinal tract. He, therefore, so far as possible, excludes mouth cleansing after birth. Often the infection may occur during birth and, of course, the prophylaxis in these cases is impossible, except in so far as prompt delivery may assist. He then reports the treatment of a case by the injection of normal human serum. The human blood serum is very easy of administration, much easier than the operation of transfusion and requires no special skill.

RICHARD M. SMITH.

HOOBLER, B. RAYMOND: THE EFFECTS OF COLD AIR ON BLOOD PRESSURE IN CHILDREN AND YOUNG ADULTS IN VARIOUS STAGES OF TUBERCULOSIS. (*American Journal of Diseases of Children,* November, 1912, p. 307.)

The author presents the study of blood pressure in cases of tuberculosis in children subjected to cold air. He found in general that children with tuberculosis have a persistently low blood pressure, but when transferred to the open air there is a gradual increase within one to two hours and if the patient is kept constantly in the open air the blood pressure is raised to well within the normal limits and stays at that point as long as the patient remains outdoors. The more advanced the case the lower the pressure indoors and the higher the rise when put in the open air. With several days in the open air the pressure does not fall as quickly when placed in the ward as previously to the outdoor treatment. RICHARD M. SMITH.

INFANT FEEDING.

BRADY, JULES M.: THE USE OF POLYCARBOHYDRATES IN THE DIET OF INFANTS. (*American Journal of Diseases of Children,* August, 1912, p. 89.)

The author discusses the use of a milk mixture containing polycarbohydrates in the feeding of asylum infants under his care. The mixture consists of 1½ ounces by measure of barley flour, cooked with 16 ounces of water at least twenty minutes down to 10 ounces, added to 20 ounces of skim milk, sweet or acidified; ½ ounce by measure of cane sugar and 1 ounce by measure of malted food containing dextrin and maltose. The carbohydrates of the mixture are: Lactose, 2.66; cane sugar, 1.30; maltose and dextrin, 1.70; barley, 2.25 (partly dextrinized). This gives a total carbohydrates of 7.91. The caloric value of 1 liter is 415. Over a period of eleven months this mixture was adopted as a routine formula. One hundred and seventy babies were cared for—90 received breast milk for the first two weeks and then received this mixture; 45 received the mixture from birth. During this period there was a remarkable absence of nutritional disturbances. Stools were good in color and consistency. No infant developed "alimentary intoxication." There was no evidence of starch injury. All but 12 babies throve satisfactorily. These 12 did not gain and were transferred to "eisweissmilch." No change was made in the routine formula, except an increase in fat percentage. Eighteen babies died, only 6 of which had gastrointestinal disturbances. These 6 died of decomposition (Finkelstein). One liter of the mixture used contains 23.11 grams of proteid. This is rather more than the supposed ideal amount of proteid in the diet, but these children showed no evidence of disturbance from this source. Theoretical objections against the possibility of the development of rickets on this diet were not substantiated in this series of cases.

RICHARD M. SMITH.

LANE-CLAYPON, JANET E.: THE VALUE OF BOILED MILK IN THE NOURISHMENT OF INFANTS AND YOUNG ANIMALS. (*Ergebnisse der Inner. Med. und Kinderhk.*, 1913, p. 635.)

The author gives a very thorough review of the subject of raw and boiled milk with a bibliography of sixty-seven names.

The conclusions are as follows:—

(1) The development of animals and infants nourished on milk of their own species shows no difference whether the milk is given raw or boiled.

(2) On a milk of a foreign species animals and infants develop *slightly* better if the milk is boiled.

(3) There is no question that animals and infants develop much better on milk of their own species, *i.e.,* human milk is best for infants and cow's milk is best for calves.

(4) It has by no means been proved that infants develop scurvy from boiled milk alone.

JEROME S. LEOPOLD.

BENEDICT, F. G., AND TALBOT, F. B.: SOME FUNDAMENTAL PRINCIPLES IN STUDYING INFANT METABOLISM. (*American Journal of Diseases of Children,* September, 1912, p. 129.)

The authors report metabolism experiments on infants with determination of carbon dioxide output. The infants studied were normal breast-fed infants who showed no evidence of physical disease and gave a negative Wassermann reaction. Records of the pulse rate were taken during the experiments and a very close relationship was found between the carbon dioxide production, the pulse rate and the muscular movements. During the periods when the infant was quiet there was a minimum pulse and a minimum carbon dioxide production. The authors are convinced that it is important in all metabolism experiments to compare carefully the pulse rate and the degree of muscular activity.

RICHARD M. SMITH.

MISCELLANEOUS.

IDIOSYNCRASY TO EGG.

BY F. TWEDDELL, M.D.,

Summit, N. J.

Schloss, of New York, in the *American Journal of Diseases of Children,* June, 1912, reports "A Case of Allergy to Common Foods." I should like to make a brief report of a remarkable idiosyncrasy to egg:—

On the 13th of May, 1912, I was called to attend an infant sixteen months old, but owing to some automobile trouble I could not reach the house for half an hour later. On my arrival I saw the little girl toddling round the room, apparently perfectly well, perhaps a little pale. Family history and previous history were negative. No previous sickness of any kind, except three months ago, when a similar attack to the present one occurred, from the same cause. An attempt was made to give a teaspoonful of the white of a coddled egg. The moment the egg touched the lips they became red and swollen, the child's face and neck turned red, and a rash resembling measles broke out all over the face, neck and hands, in fact over all visible parts of the skin, for the child was dressed. At the same time the child vomited violently, projectile type, and voided urine and feces copiously. This was followed by much prostration. The breathing at first was slow, later hurried, and the eyes were turned in a dull manner in different directions, as if the child were on the verge of a convulsion. Half an hour later the child had completely recovered and the rectal temperature then was 99⅖°F.

This attack was witnessed by the mother, a very intelligent, well-educated woman, and a nurse who had recently graduated from the Babies' Hospital, New York. I made a most careful inquiry into this case and have no reason to doubt the statements of the mother and nurse.

CONFERENCE ON PREVENTION OF INFANT MORTALITY AT LONDON IN AUGUST.

An English-speaking Conference on the "Prevention of Infant Mortality" will be held in Caxton Hall, Westminster, London, on Monday morning, Monday afternoon and Tuesday morning, August 4th and 5th. The meetings will be held under the auspices of the (British) National Association for the Prevention of Infant Mortality and the Welfare of Infancy, under the patronage of the King and Queen, and will convene immediately preceding the opening of the International Medical Congress.

A tentative programme has been issued by the committee, which indicates that the papers will consist largely of medical opinion. The subjects treated will be:

"The Responsibility of Central and Local Authorities in Infant and Child Hygiene."

"The Administrative Control of the Milk Supply."

"The Necessity for Special Education in Infant Hygiene."

"Medical Problems in Infant Nutrition."

"Ante-natal Hygiene."

The President of the Conference will be the Hon. John Burns, M. P., President for the Local Government Board. The chairman of the English Executive Committee is Sir Thomas Barlow and the secretary Miss J. Halford, 4 Tavistock Square, London, W. C.

The American Committee, in charge of the part to be taken by the United States and Canada, will furnish information to those desiring to attend the conference.

Dr. Henry L. Coit, *Chairman,*
277 Mt. Prospect Avenue, Newark, N. J.
Dr. Philip Van Ingen, *Secretary,*
125 East 71st Street, New York City.

BOOK REVIEWS.

THE MILK QUESTION. By M. J. ROSENAU, Professor of Preventive Medicine and Hygiene, Harvard Medical School; Formerly Director of the Hygienic Laboratory, U. S. Public Health and Marine Hospital Service, Washington, D. C. Pp. 309. Boston and New York: Houghton, Mifflin Company, The Riverside Press, Cambridge, 1912.

This very excellent book is the printed form of the N. W. Harris Lectures for 1912. The purpose of the lectures is "to stimulate scientific research of the highest type and to bring the results of such research before the students and friends of Northwestern University. . . ."

The selection of Professor Rosenau for the 1912 series insured the fulfilment of the purpose of the founder, and the book as it is issued is as excellent and readable an account of the Milk Question as has ever fallen into our hands. For layman and practitioner alike it is full of information and counsel. Under the headings of Milk as a Food, Dirty Milk, Diseases caused by Infected Milk, Clean Milk, Pasteurization, Infant Mortality, From Farm to Consumer we are carried through the whole subject of milk production, preservation and consumption to the solution of the Milk Problem, which, in the author's mind, means both inspection and pasteurization.

THE INTERNATIONAL MEDICAL ANNUAL. A Year Book of Treatment and Practitioners' Index. Thirty-first year. Price, $3.50. New York: E. B. Treat & Company, 1913.

Each year it happens to be our lot to review for the ARCHIVES this excellent resumé of the past year's literature and progress in medicine, and it becomes exceedingly difficult not to repeat the commendation of previous years in identical form, for each year the *Annual* proves to be one of the most helpful volumes of which our shelves boast. This year we note with regret and yet with congratulation the retirement of Dr. Still from the department of children and the entrance of Dr. Frederick Langmead to his place—regret at the removal of a familiar and respected name in the literature of pediatrics and congratulation that his successor is to be a man who will surely continue Dr. Still's work with equal skill and energy. Special chapters have been introduced on Salvarsan, Radio-Activity and Electrotherapeutics, Anesthetics, Blood Examination, Brain Surgery, Cancer, Surgery of the Lung and of the Thyroid, X-

Ray in the Diagnosis of Oral Sepsis and Syphilis by eminent writers, among whom we note Chevalier Jackson, of Pittsburgh, and George L. Richards, of Fall River.

HYGIENE OF THE NURSERY, INCLUDING THE GENERAL REGIMEN AND FEEDING OF INFANTS AND CHILDREN; MASSAGE, AND THE DOMESTIC MANAGEMENT OF THE ORDINARY EMERGENCIES OF EARLY LIFE. By LOUIS STARR, M.D., LL.D. Eighth edition, with twenty-six illustrations. 22d thousand. Philadelphia: P. Blakiston's Son & Co., 1012 Walnut Street, 1913.

The appearance of the eighth edition of this book and its twenty-second thousand shows that it had a long and careful career, while the dedication to his little patients, "some of whom in the rapid passing of time may soon assume parental duties," recalls to our memory Dr. Starr's extended experience in the care and management of children. One finds much of help in the chapters on the hygiene of the nursery and much common sense in the selection of clothing, nursery maids, exercise, amusement and schooling. The chapter on feeding, however, does not represent the present-day attitude of most pediatrists in regard to intervals for feeding, the digestibility of casein, the use of proprietary foods and the value of whey and peptonized milk, and we fear that from the abundance of material the average mother would find it hard to choose her best course. Indeed, much of the later chapters is more properly instruction to the physician than to the mother.

EXPERIMENTAL POLIOMYELITIS.—J. McIntosh and H. Turnbull (*Lancet,* February 22, 1913) record their results in the inoculation of monkeys with the material obtained from 4 cases of human poliomyelitis. They suggest that in sporadic cases the virus is feeble, and the occurrence of the disease is due to a hypersusceptibility of the individual attacked, while an epidemic results only when the virus has become exalted either by a series of passages through susceptible individuals or from some other cause unknown. It seems probable that the virus has been gradually exalted during the last three years in the neighborhood of the London Hospital, until a mild epidemic occurred in 1912. It will, therefore, be of great interest to note whether the pathogenicity increases in 1913.—*Medical Record.*

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ARCHIVES OF PEDIATRICS

MAY, 1913

ROYAL STORRS HAYNES, PH.B., M.D.,
EDITOR.

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EDITORIAL.

PHASES OF THE DISPENSARY PROBLEM.

Much can be said about the dispensary; much has been said. Dr. Cabot, for instance, is quoted as saying that there are but four really good ones in the United States. We have no doubt he is right, but wonder whether, if these four were investigated from all viewpoints, they, even, would get one hundred per cent.

The dispensary has been observed and commented upon by innumerable observers. Most of these investigations, we believe, have been aimed at correcting the abuse of the dispensary privilege by patients who can pay, or whom the authorities think can pay, to have a doctor at home. It used to be a standing story at the hospital where the writer was an interne that patients in the dispensary often came in carriages and brought their maids to accompany them. Many a false address is given and false facts as to earning capacity are commonly declared at the registrar's office of any dispensary. Not always, however, is this done with the idea of getting something for nothing, even when people can well afford to pay and in getting treatment at a dispensary tell the biggest lies. There is a feeling among many people that the physician whom they employ *may not* be telling them the truth, or, at any rate, the *whole* truth, and so they come to get unbiased advice from the out-patient department of some well-known hospital, for, in their eyes, the most recently graduated assistant takes on reflected glory and shines as bright as the famous consultant who heads the attending staff. Against all these classes the investigations have been urged, that is, against features which tend to lower the earning power of the practicing physician.

The practicing physician earns little enough, and it is not fair for competent people to get free treatment. But if the specified earning power which shall exclude from dispensary treatment be fifteen dollars a week, say, there are sure to be many families just above that who cannot get a physician, for their excess of income will not stand it. And as we go up in the scale of earning capacity we find families who can afford to call in a doctor occasionally, but not often. Here the doctor must be one whose fee is the minimum, and, usually, his ability is commensurate with his fee and the results with his ability. It doesn't take a large earning capacity for a patient to perceive when he gets good value for his money and when he does not. These people know that their chance for good treatment at the dispensary of a good hospital is better than with a practitioner whose fees they can afford. Hence the false statements, and hence, as by-products, counter-prescribing and patent medicine fortunes.

The grafting patients have been investigated, but how about the grafting doctor? Perhaps it is a natural accompaniment to the laxity in admission standards which allows admission to patients who earn more than the specified minimum, but in some dispensaries it is notorious that the doctors in attendance "pad" their practices by telling patients to come to their offices. That in some dispensaries, if detected, is equivalent to enforced resignation, and rightly; but the custom, in our opinion, is the natural, if unsightly, outgrowth of a feeling upon the part of the dispensary physician that the institution should not use him to care for unsuitable persons whom it does not rigidly exclude *and also* from the feeling, perhaps only vaguely understood, that his work in the dispensary does not repay his time.

It is more and more to be heard that it is not worth while to do dispensary work. It is increasingly difficult to find men, even recent graduates, to work in clinics. Which brings us to the question nearest to our heart—wherein does the dispensary fail toward the physician who serves in it?

The points wherein the institution fails toward the doctor are those wherein the dispensary has not kept pace with changes in medical knowledge and practice. The usual dispensary differs not materially from that of a decade or two decades ago, while modern medical practice has undergone a remarkable metamorphosis. With the exception of adding social service to the dispensaries, little has been done. This, however, has been so firmly engrafted upon out-patient work, thanks to Dr. Cabot and his imitators, that no one would think of getting along without it. This is a modern idea and should be but one of a host of modern innovations.

Modern medical work now demands, and is not content without, careful histories, thorough examination of patient, of patient's secretions and excretions, of his blood, his eyes and ears and nose, of his radiograph, perhaps. Men who have been trained in the excellent curriculum of the present-day first-class medical school, and have had interneships in modern hospitals, are not going to be content to go to work in a dispensary with nothing to work with except chairs and tables and drugs. To them the call of the laboratory is clearer. There they may do, not a more useful work, but a more exact work, a work demanding more fully the entire resources of their brains and, therefore, a more satisfying work. This exodus from the clinic, no doubt, has played its part in the predominance given to laboratory evidence over clinical observation.

The eagerness of dispensary managers for a larger clinic has overworked the physicians, and, as overwork means hurried work, and hurried work incomplete work, and incomplete work, to an honest mind, unsatisfactory work, the vicious circle has been completed by the withdrawal of men already working and the disinclination of others to enter the dispensary. The question of paying physicians who work in clinics is a moot one. The practice has its advocates and there are cogent arguments for it, if there were ever funds from which to pay a stipend. We feel, however, that the best and most fruitful medical work here will always be that which is prompted by a disinterested desire to learn and to serve; and if such a desire does not animate the dispensary physician, no amount of money can create it or its like.

But the hospitals to which the dispensaries belong make too little of them. They should be a part of the organic whole, and the character and the completeness of the work done there should be as much subject for review by the Medical Board as that of the nurses and the internes. Further, the men on the dispensary staff should be recognized in some other way than merely having their names printed in the catalogue as a part of the hospital staff; and promotion to the attending staff, through hard work in the dispensary, should be possible. Men will not work without any hope of advancement or will not work to the utmost. There have been many instances brought to our attention where years of valuable service in dispensaries have been entirely disregarded, and other, and often not superior men, have been appointed to the hospital staff. We have no doubt that these instances, so widely known, have done much in the last ten years to make men hesitate to serve in dispensaries.

That there should be organic connection between the hospital and the dispensary seems obvious. The dispensary may be an excellent feeder for the hospital, and in the cases admitted from the dispensary much of the routine work of history taking and clinical examinations may be done for the hospital if there are close and harmonious relations between in- and out-patient departments. Such a condition might be accomplished if the chiefs of clinics were also associate attending physicians in the hospitals, cognizant of both classes of service and keeping the standard equal. It is an economic waste to have a patient come back and back for months, or years even, until his or her "constitution" is known to the dispensary physician as he knows those of his private practice, only to have the patient swallowed up by the in-patient service and fall into the hands of doctors who cannot possibly supply all that the out-patient physician has learned and who yet, because of the system, disregard that knowledge. And to the out-patient physician it is very unsatisfactory to lose track of a case when it becomes interesting enough to gain admission to the hospital.

One asks, What of the isolated dispensary which has no hospital? In our opinion, such are out of date, survivals of a different age and from the nature of things inefficient. We would feel that the only way for such to properly do their work would be to combine into large dispensaries, with all branches of specialties represented, with clinical laboratories and X-ray rooms—everything, in short, but beds.

To recapitulate, the dispensary needs the hospital (as the hospital needs it) in close organic connection, with some of the in-patient attending physicians, out-patient attending physicians as well; with all branches of specialties represented; with laboratory facilities; with not too many patients and with plenty of doctors to care for them who will have hope of advancement and satisfaction in their work to spur them on.

EDITORIAL NOTE.

DR. BAGINSKY A SEPTUAGENARIAN.

Adolph Bakinsky was born in Ratibor, Prussia, May 22d, 1843. He studied in Berlin from 1861 to 1863. Later was a student of Virchow and Traube. He studied in Vienna in 1864 and again in Berlin in 1865 and 1866. During an epidemic of cholera in 1866 he was an assistant in the City Hospital. He passed his State Board examination in 1867 and entered the practice of medicine in 1868 in the town of Seehausen near Magdeburg. Was in charge of a military hospital in 1870 and 1871. In 1872 he returned to Berlin. He founded a polyclinic for children's diseases which he continued for many years.

In the year 1896, in conjunction with Rudolph Virchow, the Emperor and Empress Frederick Children's Hospital was established, with Baginsky as the director and supervising physician. This institution was endowed by the Empress Frederick to commemorate the death of her husband. The institution has increased in size and covers an area equal in size to our Bellevue Hospital grounds. The institution has now been acquired by the City of Berlin. There are large buildings devoted to scarlet fever, diphtheria, whooping cough, measles, typhoid fever, vulvovaginitis, syphilis.

In 1877 Baginsky, in conjunction with Alois Monti, founded the *Central Zeitung,* which, two years later, was changed into the *Archives für Kinderheilkunde,* of which Baginsky is still chief editor. Among the many scientific contributions which Baginsky has made is his "Manual of School Hygiene," which appeared in 1876, and which has since gone through many editions. His text-book on "Diseases of Infancy and Childhood" has seen almost a dozen editions. His book on "Serum Therapy in Diphtheria" appeared in Berlin in 1895. A book on "Diphtheria and Diphtheritic Croup" was part of Nothnagel's "Manual of Special Pathology and Therapy."

In 1891 Baginsky was appointed an Extraordinary Professor of Diseases of Children in the University of Berlin, which appointment he still holds. In 1890 he edited a Festschrift in honor of the seventieth birthday of Professor Henoch. Although many articles and scientific contributions have been published on the treatment of diphtheria by antitoxin, none have proven more valuable than Baginsky's, published in the *New York Medical Record,* October, 1894.

Baginsky has always been in the front rank of those who have fought for progressive hygiene in children, and his research work and physiologic chemistry are too well known to require repetition.

His American colleagues unite in congratulating him on the seventieth anniversary of his birthday (May 22d), and wishing him continued health, so that his scientific work may be continued to them many, many years. LOUIS FISCHER.

ORIGINAL COMMUNICATIONS.

CHRONIC INFECTIVE ENDOCARDITIS.

BY EDMUND CAUTLEY, M.D., CANTAB., F.R.C.P. LOND.

Senior Physician to the Metropolitan Hospital and to the Belgrave Hospital for Children, London.

In view of the frequency of cardiac affections in children, both congenital and acquired, it is somewhat astonishing that infective endocarditis is not a more common occurrence. This seems particularly remarkable when we remember the great liability to infective disorders in early life. The disease is less infrequent in older children and young adolescents, and is usually acute in type. Recovery is exceptional. Many years ago I reported a case of recovery from acute infective endocarditis (*Lancet,* 1891, Vol. I., p. 1,375) of the *tricuspid* value in a young adult, aged twenty-one years, under the care of the late Dr. James Andrew. The case was of the pyemic type, with rigors and temperatures as high as a maximum of 106.6°F., enlarged spleen, and attacks of pain in the sides which were ascribed to pulmonary infarction, though there was no blood-stained sputum. Patient was ill for 5 weeks before admission and was in hospital for three months. He was discharged cured, except for a permanent tricuspid regurgitant murmur, which was still present when he was examined nine months later.

A more acute case, secondary to *mitral* valvular disease of rheumatic origin, was that of a girl aged sixteen years (*Reports of Society for Diseases in Children,* Eng., 1907, Vol VII., p. 152). Nineteen days after admission to hospital she died of cerebral hemorrhage from rupture of an aneurysm of the left posterior cerebral artery, due to embolism. A large mass of vegetations was present on the wall of the left auricle, and it was astonishing that there were not numerous infarcts present. In this case there was little fever, the highest temperature recorded being only 101°F., and it was often below normal.

Endocarditis of the infective type was also the cause of *pulmonary* regurgitation in a girl, aged fifteen years (*Lancet,* January 25th, 1902). She had had rheumatic fever two years before admission to hospital, and presented signs of congenital heart disease. She died from recurrent hemoptysis, due to emboli carried to the lungs. The degree of fever was variable and never very high. At the autopsy large warty vegetations were found on two of the pulmonary valves, with apparent loss of substance, and much infarction of the lungs. There was no evident breaking down of the infarcts.

In another case, that of an eight-year-old boy (*British Journal of Children's Disease,* July, 1905) who was admitted to hospital for meningitis, there was a peculiar chronic verrucose condition of the *aortic* valves. The boy died from purulent meningitis eleven days later. The aortic valves were the only ones affected. Possibly there had been a primary congenital defect, for there was a history that the boy had been in another hospital some years previously for "weak heart." Above the valves there was a flat, circular, inflammatory patch, looking like a large sessile wart. The pericardium contained recent effusion of serum and blood; and there was a recent infarct, the size of a small walnut, in the base of the wall of the left ventricle, commencing to break down; and a recent infarct in the spleen. Had it not been for the meningitis, probably due to infection carried from the heart, life might have been prolonged; but not for long, in view of the cardiac condition.

These 4 cases are in accordance with the established opinion that infective endocarditis is secondary to pre-existent valvular disease and may affect any valve. The virulence of the infective organism is variable. Death results more commonly from the secondary effects, such as cardiac failure or infarction, etc., rather than from the toxemia. The 2 next cases, which I report somewhat more fully, are illustrative of these points.

CHRONIC INFECTIVE ENDOCARDITIS OF THE PULMONARY VALVE IN A GIRL, AGED EIGHT YEARS, IN HOSPITAL FOR OVER EIGHT MONTHS.

Autopsy.—Hypertrophy of right ventricle. Pulmonary orifice stenosed and its valves covered with partially calcified vegetations. Similar vegetations and slight ulceration of the artery for half an inch above the valves, due to an ascending arteritis. An ante-mortem clot in the pulmonary artery. The mitral valves a little thickened. A large interventricular communication in the common situation. *Lungs.*—Adhesions at the right apex; an old healed infarct at the right apex, beginning to calcify, and a more recent infarct at base of left lung. Congestion of liver, spleen and kidneys. Weight of child on day before death 29 pounds. Weight of organs.—Heart, 7 ounces; right lung, 9 ounces; left lung, 7 ounces; liver, 33 ounces; spleen, 13 ounces; kidneys, 5 ounces each.

Synopsis.—The patient, a girl born June 30, 1903, was admitted into the Belgrave Hospital for Children on April 1st, and she died on December 13, 1912. Except for measles two years previously she had no history of illness. On March 12th she attended the out-patient department for cough of two weeks' duration and for wasting. On examination there were noted bronchitis on the left side, a systolic pulmonary murmur and clubbing of the fingers.

On admission she was feverish and became slightly dusky on crying. She weighed 32 pounds, 4 ounces. The clubbing of the fingers was only slight. Examination of the heart showed moderate hypertrophy of the right ventricle, the apex beat in the nipple line in the fourth space, no thrill, and a long systolic pulmonary murmur. The spleen was enlarged and the urine normal. From this time onward the notes may be abbreviated to a monthly report as follows:—

April.—Hectic temperature, 98°–104° F. Subsidence of bronchitis a few days after admission. An attack of pain in the right shoulder on the 22d, and displacement of the cardiac apex to half an inch outside the nipple line. April 30th: Stationary weight.

May.—Same range of temperature. On the 20th another attack of pain in the right shoulder and axilla. Spleen larger. May 28th: Loss of 12 ounces.

June.—Temperature much lower, though still hectic in type, for the first half of the month. A slight pulmonary thrill felt. An attack of pain in the left shoulder on the 2nd and in the right shoulder on the 28th. Weight on 28th, 33 pounds, a gain of 24 ounces.

July.—The spleen reached the umbilicus. Pain in right shoulder on 8th. Liver one inch below costal margin on 12th. Temperature lower for a week toward the end of the month. Weight stationary on July 9th. On the whole, no definite loss of ground.

August.—Loss of 8 ounces on August 9th. Antistreptococcic serum was given on the 4th with no apparent effect. On the 8th the child developed some bilateral hydrothorax and became slightly cyanosed, with the cardiac apex 1½ inches outside the nipple line. The liver and spleen were larger. On the 12th antistreptococcic vaccine was given with no apparent effect. On the 14th there was pain in the spleen, which reached below the umbilicus. A blood culture on the 17th was negative. During this month there was considerable loss of ground, yet the temperature kept about normal from the 15th to the 20th.

September.—The temperature became more hectic, with a range of 7° F., from now to the beginning of December. Weight on 17th 30 pounds, 9 ounces, a loss of 31 ounces. General loss of strength and flesh. Spleen larger. Liver extends 2½ inches below costal margin. Slight edema of sacrum and a trace of albuminuria. Cardiac signs unaltered. More vaccine tried, but with no beneficial result.

October.—The spleen now reached the level of the anterior superior spine of the ilium. Blood examination.—3,000,000 red cells, 30,000 white cells, 60 per cent. hemoglobin.

November.—Much worse generally, edema of the legs and ascites.

December.—Temperature much lower and smaller in range; only an occasional rise in the last week of life. Spleen became smaller and the edema and ascites subsided. On the 12th the child developed diarrhea. Next day she became very dyspneic, with a very weak and irregular pulse, and died suddenly.

Comments.—I think the conclusion is a just one that this patient died from the secondary effect of the disease, namely, thrombosis in the pulmonary artery, though no doubt the prolonged toxemia and resultant wasting may have been partially the cause of the local thrombosis. The condition of the valves and orifice was such that clotting might have occurred much earlier in the course of the illness. Serums and vaccines seemed valueless, but as attempts to grow the infective organism from the blood were failures it was impossible to try the effect of an autogenous vaccine. That the infective organism was one of low virulence is proved by the slight degree of ulceration of the infected valves and artery, the scarcity of the infarcts and the absence of breaking down of such infarcts. In fact, one of the two found had undergone calcification. The illness throughout was one of prolonged fever and wasting, with remarkably little variation in the symptoms or physical signs from day to day. Had it not been for the thrombosis it might have been much more prolonged. Indeed, it is not unreasonable to suppose that it might have terminated in recovery, seeing that the fever had practically subsided. One noticeable feature was the reduction in fever with the onset of edema and ascites, suggesting that the toxin had been excreted into the exuded serum and destroyed in the tissues.

CHRONIC INFECTIVE ENDOCARDITIS OF THE TRICUSPID AND AORTIC VALVES IN A BOY, AGED EIGHTEEN YEARS, IN HOSPITAL FOR SEVEN MONTHS.

Autopsy.—Pericardium contained an excess of fluid; firm band of adhesions on wall of left ventricle near apex. General hypertrophy of heart, especially of the auricles. Large, soft, yellow, villous fringes of granulations on the tricuspid valves and similar ones, almost as marked, on the aortic valves. The mitral valve puckered by old inflammation.

Infarction of the right lung, one infarct being softened and forming a cavity. Left lower lobe consolidated, resembling tuberculous bronchopneumonia. Spleen much enlarged and firm. Liver pale and fatty. Kidneys congested. A little ascitic fluid.

Synopsis.—Thomas J. H., eighteen years, was admitted to the Metropolitan Hospital on January 14th, and he died on August 18, 1912. He had measles at five years of age, and "growing pains" at eight years, when his heart was found to be affected. Since then he has never been strong and has frequently attended as an out-patient at another hospital, and occasionally as an in-patient for attacks of dyspnea and blueness. He was admitted for morbus cordis and fever. Condition on admission.—Pale, with a faint flush on the cheeks and visible pulsation in the neck. Temperature 101°F., pulse 120, respirations 26 per minute. Cardiac apex half an inch outside the nipple line in the fifth interspace, visible precordial pulsation, no increased dullness to the right. A marked systolic thrill, especially over the pulmonary area. A loud, harsh systolic murmur over the precordium, with its maximum intensity over the third left interspace, and heard in the neck, axilla and over the back. A skiagram showed enlargement of the left ventricle. The diagnosis made was one of infective endocarditis of the mitral and aortic valves. During January the boy's weight rose from 78 pounds, 4 ounces on the 18th to 86 pounds on the 29th. The fever was irregular, under a maximum of 102°F., and from the 24th-26th below normal.

February.—The temperature was irregular, rarely above 100°F. On the 4th his weight had fallen to 79 pounds, 6 ounces. After this he was no longer weighed. On this date the thrill and murmur were more widely distributed, especially to the left, and the question arose as to whether the pulmonary valves were affected. There was, however, no evidence of hypertrophy or dilatation of the right ventricle. The spleen was now palpable and its area of dullness much increased. Cultures from the blood proved negative. A week later it was noted that the thrill was still more marked and that the patient sweated freely at times.

March.—The temperature rose to 101°F. on three evenings, but at other times ranged between 97°-99° F. There were occasional attacks of pain in the left shoulder. The spleen enlarged. On the 28th there was cough, with pain in the right side of the chest and impaired note in the axilla.

April.—Temperature kept fairly low, rarely up to 101°F. The apex of the heart was felt further outwards, an inch beyond the nipple line, and the spleen became larger and harder. Towards the end of the month the boy became markedly drowsy.

May.—Temperature keeps about the same level and drowsiness persists. On the 6th the cardiac apex was in the nipple line and the spleen somewhat smaller. On the 13th there was an attack of pain with effusion of fluid at the base of the left lung. On the 27th pain returned in the left shoulder.

June.—During the first two weeks there was considerable improvement. Then there was pain in the right side and higher fever, up to 102°F. or 103° at times. On the 17th there was catarrhal sore throat and increased drowsiness, followed, ten days later, by vomiting, more dyspnea, dilatation of the left ventricle and more dullness at the left base, probably in part due to the increased size of the heart, the apex being two inches outside the nipple line. Blood cultures were still negative.

July.—Blood Examination: Red cells, 2,232,000; hemoglobin, 45 per cent.; color index, 1.02. White cells, 6,200; polymorphs, 86.5, and lymphocytes, 13.5 per cent.; no other types of cells. There was a great diminution in the number of red and white cells compared with the blood count in the previous week.

The temperature kept at a lower level during this month, being usually 99°-101° F. In the first week of the month the dullness cleared up at the left base, although the apex of the heart remained one and one-half to two inches outside the nipple line. Pallor and drowsiness increased. The spleen continued to enlarge. On the 11th there was a return of the dullness at the left base and the spleen reached the navel. Bronchial breathing was present a few days later. On the 25th there were characteristic signs of consolidation of the left lower lobe. After this the boy gradually failed and died from asthenia. In August the temperature only occasionally rose to 101°F.

On July 16th cultures from the blood yielded streptococci at the end of thirty-six hours. It is possible that these were due to a terminal infection. An autogenous vaccine was prepared and given in the dose of 1,500,000 on the 20th, 3,000,000 on the 25th, 6,000,000 on the 31st, 12,500,000 on August 6th and 25,000,000 on August 13th.

Comments.—Just as in the last case, death was not the direct result of the prolonged fever, toxemia and wasting, being apparently due to a terminal infection of the lower lobe of the left lung and secondary cardiac failure. I doubt the streptococcus eventually recovered from the blood being the primary cause of the disease. The degree of fever is noticeably less, and the type not hectic, in comparison with that of the previous case, and yet the vegetations on the valves were much more extensive and one of the infarcts had broken down and formed a cavity in the lung.

Treatment was conducted on general lines. The outlook is very hopeless, although rarely cases have ended in recovery. Little can be hoped for from vaccine and serum treatment at present. It is difficult to grow the infective organism from the blood—difficult to be certain that the organism grown is the *fons et origo mali,* and difficult to obtain any apparent benefit from treatment by either serum or vaccines. The mechanical and secondary effects are so serious that death is likely to ensue from such causes before any specific treatment can prove curative. On the other hand, in early cases it is possible that treatment on such lines may enable the body tissues to destroy the infective agent and thus prevent the disintegrating process leading to infarction and secondary abscesses. Drugs such as quinine, arsenic, iron and perchloride of mercury are of some value.

DIPHTHERITIC PARALYSIS.

BY J. D. ROLLESTON, M.D.,

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During the last ten years I have been in the habit of keeping notes of all the cases of diphtheria that have been under my care, so that I have now the records of 2,300 completed cases. Observations on the occurrence of paralysis among my cases have been published by me from time to time,* but, as it is now nearly four years since the figures of my last series consisting of 1,500 cases appeared, the following remarks may be of interest:

A comparison of the following figures with those given in my earlier papers will show that as a result of the observations having been carried out by a single individual, there is not the wide discrepancy between the results obtained which is likely to take place in a collective investigation.

The opportunities for observing the onset of paralysis were exceptionally favorable, as no children admitted with diphtheria were discharged before the end of the sixth week. It is most exceptional for paralysis to develop after that date, except in cases which have shown previous signs of nervous involvement.

Frequency.—Of the 2,300 cases, 477, or 20.7 per cent., showed some form of paralysis; 184 were severe and 85 were fatal. In each series of 100 the percentage of paralysis cases was never less than 10 or more than 31.

The much lower figures of other observers, *e.g.,* 11 per cent., noted by Sanné among 1,382 cases of diphtheria, and 9 per cent. by the collective investigation of the American Pediatric Society, are possibly due to several mild forms of palsy, especially nasal voice or cycloplegia having been overlooked.

Character of Initial Attack.—It has been my invariable practice, directly the throat has become free of membrane, to classify the case in one of six classes, the names of which are given in the following table. By this method one is enabled to determine the relation of the initial angina to the frequency and severity of the subsequent paralysis. The table clearly shows that there exists a close relation between the acute attack and the subsequent paralysis. Statements to the contrary have chiefly been made by neurologists who have not had the opportunity of observing the initial attack:—

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* *Practitioner,* 1904, Vol. LXXIII., p. 614, and 1909, Vol. LXXXII., p. 110; *Review of Neurology,* 1906, Vol. IV., p. 608; *Lancet,* 1906, Vol. II., p. 322, and 1908, Vol. II., p. 261.

TABLE I. SHOWING RELATION OF PARALYSIS TO CHARACTER OF INITIAL ATTACK.

A. Faucial cases, with or without nasal and laryngeal involvement.

Character of initial attack.			Paralysis cases of all kinds.	Percentage.	Severe paralysis cases.	Percentage.
Class I.	Very severe	216 cases	153	70.8	104	48.1
" II.	Severe	415 "	193	46.5	65	33.6
" III.	Moderately severe	169 "	39	23.6	3	1.7
" IV.	Moderate	498 "	68	13.6	9	1.8
" V.	Mild	890 "	23	2.5	0	0
" VI.	Very mild	62 "	0	0	0	0
		2,250	476		181	

B. Nasal cases only.	Severe	1	No paralysis
	Moderate ..	6	
	Mild	20	
	Very mild ..	3	1 case
C. Laryngeal cases only.	Severe	11	No paralysis
	Moderate ..	8	
	Mild	1	
		50	

Of the 216 very severe cases 50 died of toxemia before any paralysis developed, so that all but 13 of the survivors had some paralysis. It may also be noted that 107 cases of that most malignant form of the disease known as hemorrhagic diphtheria, with the exception of the toxemic cases just mentioned, all had paralyses of a severe kind.

Paralysis was found to be much more frequent and severe in cases in which the nostrils were involved as well as the throat than in those in which the fauces alone were affected. Thus, among 570 faucial and nasal cases there were 240 paralysis cases, or 42.1 per cent.. 133 of which were severe, as compared with 237 paralysis cases, or 14.1 per cent., 51 of which were severe, among 1,680 of faucial diphtheria, including laryngeal cases but excluding those with nasal involvement. On the other hand, only one of the purely nasal cases which was admitted on the fifth day of the disease with a slight nasal discharge, which cleared up without antitoxin, developed paralysis—a cycloplegia of three weeks' duration. No paralyses followed any of the 20 purely laryngeal cases.

Paralysis following purely cutaneous diphtheria has been recorded, but no such case has come under my notice. Not only is actual paralysis more common after severe than after mild diphtheria, but affection of the tendon jerks and the presence of Babinski's sign is more common in severe than in mild attacks, as is shown in Table II.

The superficial reflexes are only lost in cases of generalized paralysis.

TABLE II. RELATION OF AFFECTION OF TENDON JERKS AND OF BABINSKI'S SIGN TO CHARACTER OF INITIAL ATTACK.

	Knee-jerks lost.	Tendo-Achillis jerks lost.	Babinski's sign.
Classes I., II., III. ..	34.4	27.3	27.9
Class IV.	11.1	7.6	14.0
Classes V. and VI. ..	7.2	3.3	9.3

Paralysis after Relapses and Second Attacks of Diphtheria.—By a "relapse" is meant the reappearance of the disease after recovery from the initial attack but before discharge of the patient from hospital. The term "second attack" is applied to cases in which the two diseases did not occur during a single period of detention in hospital. Of the 2,300, 31, or 1.3 per cent., had relapses, which were separated from the initial angina by periods varying from three to fourteen weeks. Two of the 31 had palatal and ocular palsies after the first attack, but none showed any paralysis after the relapse. This absence of any paralysis is an evidence of the invariably mild character of relapses, which is due in part to the disease being cut short by the prompt administration of antitoxin, and in part to the immunity conferred by the primary attack not being completely exhausted.

Fifty, or 2.1 per cent., had second attacks, which were separated from the primary by intervals varying from three months to fourteen years. In 21 the first attack had occurred in the Grove Hospital, so that their records were available. One of the cases had paralysis during the first attack and 3 had paralysis after their second illness who had previously escaped any nervous sequelæ. In only 1 case, which I have recorded elsewhere,* were both attacks followed by paralysis.

Relation of Age to Paralysis.—Table III. shows that, contrary to the teaching of Landouzy, whose table of age periods is adopted here for the purpose of contrast, paralysis is more frequent in children than in adults, the great majority occurring between two and six years of age.

TABLE III. SHOWING RELATION OF AGE TO PARALYSIS.

Age	0-2	2-6	6-10	10-18	18-20	20-30	30-40	40-50	50-60
Number of patients	106	1,066	679	278	18	95	42	12	4
Number of paralysis cases	19	239	160	49	0	8	2	0	0
Percentage of paralysis cases	17.9	22.4	23.5	17.6	0	8.4	4.7	0	0

During the first year of life diphtheria is comparatively uncommon, being represented in the present series by only 18 cases, two of which had paralysis, in each case precocious palatal and cardiac paralysis. Only 10 cases, or 5.8 per cent., 2 of which were severe, occurred after eighteen years, although 171 of the patients were above that age, the oldest case being that of a woman of thirty-five who had ciliary palsy of twenty-six days' duration.

The rarity of serious paralysis in adult life is further shown by the following figures. Of the 80 cases of cardiac paralysis the oldest patient was thirteen years. Of the 36 cases of pharyngeal palsy the oldest patient was fourteen years. Of the 36 cases of paraplegia only two were over eight, one aged fourteen and one aged twenty-nine years. Of 16 cases of paralysis of the diaphragm the oldest patient was aged eight years. Precocious paralysis of the palate, which is much more persistent than paralysis developing later, occurred in 139 cases, but only one patient, aged twenty-nine, was above fifteen years. Lastly it may be noted that of the 73 recorded cases of post-diphtheritic hemiplegia the oldest patient was seventeen years.

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* *Journal of Nervous and Mental Diseases*, 1910, Vol. XXXVII., p. 164.

Not only actual paralysis, but abolition of the tendon jerks, also is commoner in children than in adults. Thus among 1,550 cases of diphtheria in which the knee and ankle jerks were examined, the knee jerks were lost in 267 and the ankle jerks in 196, but only four of these cases occurred in patients over fourteen years, although 149 of the 1,550 were above that age.

I have recently shown* that Babinski's sign may be found in a considerable percentage (19.6 per cent.) of all cases of diphtheria during the acute stage, being probably due to a transitory perturbation of the pyramidal system by the circulating toxins. This sign though not confined to infants and liable to be met with up to adult life shows a marked decrease in frequency and duration after the eighth year.

Relation of Paralysis to Antitoxin.—The following table confirms my previous observations on the prophylactic value of the serum treatment of diphtheria. Whereas in pre-antitoxin times early treatment had no power to cut short the disease or to prevent paralysis, early injection of antitoxin undoubtedly jugulates the disease and tends to diminish the occurrence of subsequent complications.

TABLE IV. SHOWING RELATION OF PARALYSIS TO DAY OF DISEASE ON WHICH ANTITOXIN WAS INJECTED.

Day of disease.	Total number of cases injected.	Paralysis cases.	Percentage.	Severe forms only.	Percentage.
1st day	83	3	3.6	0	0
2d "	461	65	14.09	18	3.9
3d "	541	116	21.4	41	7.5
4th "	460	124	26.9	46	10.0
5th "	304	80	26.3	41	13.4
6th "	166	45	27.1	21	12.6
7th " and later.	215	40	18.6	17	7.9
	2,230	273		184	

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* *Review of Neurology and Psychiatry,* 1910, Vol. VIII., p. 404.

Among 70 cases which did not receive antitoxin only 4 in whom no membrane was present on admission developed paralysis, in each case of a mild character.

On the other hand the value of antitoxin in late cases is shown by the following figures: 396 or 12.8 per cent. were admitted after the fifth day of disease. With the exception of 21 very mild cases, all in whom membrane was present received antitoxin. Of the 396, 36 died, a mortality of 9.09 per cent. As in the pre-antitoxin days the mortality never sank below 23 per cent. and often rose to 50 per cent. or higher, the advantage of even late injection is obvious.

Table V. Showing Date of Onset and Frequency of each Form of Paralysis.

	Palatal.	Ciliary.	Squint.	Cardiac.	Labial.	Paraplegia.	Pharyngeal.	Diaphramatic.
1st week	29	0	0	31	0		0	0
2d "	109	0	0	49	0		0	0
3d "	67	8	10	0	0		0	0
4th "	40	87	9	0	1		1	1
5th "	32	91	12	0	8		4	1
6th "	40	34	11	0	17		14	4
7th "	14	12	19	0	13		15	3
8th "	0	4	19	0	10		2	7
	331	236	80	80	49	36	36	16
Percentage frequency	14.3	10.2	3.4	3.4	2.1	1.1	1.1	0.6

The only palsies which occur during the first fortnight of the disease are cardiac and palatal paralysis. The term cardiac paralysis though convenient is by no means a suitable term, for in several of the so-called cases of cardiac paralysis there has been an absence of nerve lesions. Experimental work on animals and sphygmomanometric observations on man have shown that vaso-motor paralysis is a more accurate designation, the heart failure being secondary to the vaso-motor affection.

In the present paper the term cardiac paralysis is applied to a syndrome arising after the throat has become clean and consisting in alteration of the normal heart sounds, low blood pressure, enlargement of the liver, oliguria, sometimes anuria, retching and vomiting. Death is preceded by an algid state sometimes lasting many days, in which no radial pulse can be felt. The term cardiac paralysis has been restricted to the fatal cases, although recovery may take place and the heart may resume its normal condition without any residues being left. In rare cases, however, cardiac thrombosis may give rise to cerebral embolism, manifested by hemiplegia* or to embolism of the extremities leading to gangrene,† examples of which I have recorded elsewhere. Recent work has shown that the cardiac lesion may be of the nature of heart-block. A case of auricular fibrillation has also been recorded by Price and Mackenzie.

Disturbance of the heart's action may occur at any period of convalescence from diphtheria, but no cases of so-called cardiac paralysis in this series proved fatal in which the symptoms had not developed before the end of the second week. I would here repeat, what I have stated on previous occasions, that I have never met with a case of sudden unexpected death in convalescence from diphtheria.

Closely analogous to the early cardiac paralysis is the so-called precocious paralysis of the palate,‡ revealed by a nasal voice and less frequently by regurgitation of fluids through the nose, which occurs in the first fortnight of the disease. Like cardiac paralysis it is almost invariably associated with malignant forms of diphtheria, as is shown by the high mortality, association of other grave symptoms during the acute stage, and subsequently by more frequent development of paralysis in cases in which it occurs.

Histological investigations by Hochhaus, Deguy and others have proved the condition to be due to an interstitial myositis.

The extensive superficial necrosis which occurs in the severe forms of diphtheria accounts for the unusually long duration of this variety of palatal paralysis.

In the present series ocular paralysis never occurred before the third week and only exceptionally before the fourth. As a rule cycloplegia preceded squint. In most cases paralysis of accommodation exists alone without coincident paralysis of the sphincter pupillæ. Squint which in most cases was an internal strabismus usually occurred later and was much less frequent than paralysis of accommodation.

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* *Review of Neurology,* 1905, Vol. III., p. 722.

† *British Journal of Children's Diseases,* 1910, Vol. VII., p. 529.

‡ *Review of Neurology,* 1906, Vol. IV., p. 608.

After the first fortnight no serious palsy as a rule need be feared before the fifth week. It is at this time and still more frequently in the sixth and seventh weeks that the generalized form of paralysis is liable to develop, including paralysis of the pharynx and diaphragm. Vasomotor changes, such as diffuse and transient erythema, urticaria, dermographism and hyperidrosis are frequently associated with the generalized paralysis.

Palsies of the facial muscles or of the lip muscles alone, vesical and rectal troubles, may also occur at this period. Disturbance of sensation does not usually occur till late, but the detection of its impairment in young children is impossible.

It is interesting to note that though the knee and ankle jerks may be lost at an early stage, it is not until the condition of generalized paralysis is reached that the superficial reflexes are abolished. Their loss is much less frequent than that of the tendon reflexes and of much shorter duration.

Duration of Paralysis.—With the exception of the cases of early onset in which the nasal voice may last for two months or even more, paralysis of the palate rarely lasts longer than three weeks. The average duration in the precocious cases was 41.19 days, the longest period being eighty-five days. In the cases in which the palate was affected after the end of the second week the average duration was 17.4 days.

The duration of ocular palsy is about three weeks. Among 210 cases of ciliary palsy in which the duration could be fixed, the average period was 21.1 days, the longest noted being forty-six days. In 62 cases of squint the average duration was 18.4 days, the longest period being forty-three days. It is fortunate that the most serious forms of late paralysis, viz., paralysis of the pharynx and diaphragm should be not only much less frequent but also of much shorter duration than the other varieties of post-diphtheritic paralysis. The average duration of complete paralysis of the pharynx necessitating artificial feeding by nasal or rectal tube was 11.4 days, the longest period being twenty-two days. Diaphragmatic paralysis is of even shorter duration, the average period being 7.8 days. Complete loss of motor power in the lower limbs rarely lasted more than ten days in any of the present series. The average duration was 9.6 days.

About a dozen cases of chronic diphtheritic paralysis have been recorded, but I have never met with an example.

Mortality.—The following figures show the place occupied by paralysis as a cause of death in diphtheria. Of the 2,300 cases 171 died—a mortality of 7.4 per cent. On subtracting 33 cases which died within twenty-four hours of admission the deaths are reduced to 138—a mortality of 6.0 per cent.; 54 died of toxemia within the first few days of disease before paralysis, apart from precocious palatal palsy, had had time to develop. Nineteen deaths were due to extension of the membrane to the larynx in 127 tracheotomy cases. Broncho-pneumonia apart from tracheotomy caused 10 deaths. Intercurrent diseases, viz., 2 cases of scarlet fever and 1 of congenital syphilis were responsible for three deaths. The remaining eighty-five deaths were due to paralysis, but in only five did the paralysis start after the end of the second week, death in these 5 cases being due to paralysis of the diaphragm. In the rest (eighty) death was due to cardiac paralysis, the first signs of which had arisen before the beginning of the third week.

Prognosis.—The outlook in diphtheritic paralysis may be said to depend upon the age of the patient, the date of onset, and the situation of the paralysis. The older then the patient, the better the prognosis. Cardiac pharyngeal and diaphragmatic palsies are the only forms which need cause anxiety. It has already been shown that no fatal case was met with above the age of thirteen and that no case of paralysis of the pharynx was met with over fourteen or of the diaphragm over eight years.

Paralysis of the palate occurring during the first fortnight is not only likely to be more persistent than the ordinary form but also not unfrequently heralds fatal cardiac paralysis. The evil significance of precocious paralysis of the palate is shown by a mortality of 35.2 per cent. among 141 cases in whom it was found, as compared with a mortality of 1.5 per cent. among 190 cases in which the palsy first occurred after the end of the first fortnight. Closely associated with the so-called cardiac paralysis is a progressive enlargement of the liver partly due to congestion and partly to fatty degeneration. The following figures illustrate its untoward significance. Out of 111 cases in this series who showed any signs of liver enlargement seventy-one died—a mortality of 63.9 per cent. as compared with a mortality of 6.7 per cent. (130 deaths) among 1,920 cases of diphtheria in whom a routine examination of the liver was made.

On the other hand the occurrence of a well-marked serum reaction occurring at the usual period after injection is of very favorable omen, it being most exceptional for those cases to die from cardiac paralysis in whom an urticarial eruption has been well developed.

I have shown elsewhere* that sphygmomanometry in diphtheria though of considerable theoretical interest and of some value in conjunction with other prognostic signs is by no means indispensable in forming the prognosis. It is interesting to note, however, that while early cardiac paralysis is accompanied by a progressive fall of blood pressure, any change in the blood pressure in late paralysis is in an upward direction, thus suggesting an irritative condition of the vasomotor center in the medulla in which the other nerves are undergoing a varying degree of paralysis. Cardiac disturbance arising after the end of the first fortnight of diphtheria is not uncommon but in none of the present cases was death due to cardiac paralysis in which the heart had remained normal until the beginning of the third week.

The prognosis of pharyngeal palsy depends upon the ability of the patient to support artificial feeding, the extent of involvement of the other muscles, especially the diaphragm, and the condition of the lungs. When once the power to swallow is regained progress as a rule is remarkably rapid.

Treatment.—In addition to the early use of antitoxin which as shown above is the best means of preventing paralysis, rest in bed in the recumbent position for a period varying with the severity of the initial angina should be enforced. In mild cases the patient may be allowed to sit up by the end of the third week and two days later to leave his bed. In severe cases it is advisable not to let the patient sit up before the end of the sixth week and only then if no paralysis has developed. If by the end of the seventh week there be no other paralysis but that indicated by a nasal voice, defective accommodation or an irregular heart, the patient need not be kept in bed.

The transitory character and incomplete development of the most frequent diphtheritic palsies, viz., palatal paralysis and cycloplegia, renders any special treatment unnecessary, and it is highly improbable that any treatment can curtail their duration. On the other hand, in cardiac paralysis, and paralysis of the pharynx and diaphragm active measures are required. In all severe cases the prophylactic administration of adrenalin is of service either by mouth or subcutaneously to forestall or combat the suprarenal insufficiency which plays so large a part in cardiac paralysis.

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* *British Journal of Children's Diseases*, 1911, Vol. VIII., p. 433.

Vomiting should be met by the prohibition of food by mouth and the substitution of nutrient enemata containing Pot. brom. gr. xxx and Tinct. bellad. m. xx in alternate feeds. The dangers associated with nasal feeding in pharyngeal paralysis owing to the anesthesia of the larynx and the risk of deglutition bronchopneumonia make it advisable to substitute rectal feeding, which may be adopted all the more readily as the paralysis does not as a rule last longer than a fortnight. During this period injection of strychnine and the addition of belladonna to the nutrients are indicated.

The loss of motor power in the lower limbs which is most likely to be met with in cases convalescent from pharyngeal palsy is not usually of long duration. The psychical element which is present even in young children needs to be taken into consideration. Fear of falling tends to increase their unwillingness to move and requires vigorous counter suggestion. It will usually be found that by encouragement and support remarkable progress will soon be made. Except in cases of hemiplegia, electricity and massage are rarely required.

THE LEUKOCYTE COUNT IN OSTEOMYELITIS AND TUBERCULOUS OSTEITIS IN CHILDREN.—E. W. Fiske (*Boston Medical and Surgical Journal,* April 24, 1913) has found that the routine examination of children with tuberculosis of the bones and osteomyelitis, two-thirds of the cases in both diseases being in an acute stage, shows an average white count of 11,600 for the former and 16,200 for the latter, a significant difference of about 5,000 leukocytes. That this difference is constant, and is a reliable factor in diagnosis, is shown by the fact that in osteomyelitis but 24 per cent. of the counts were below 12,000, as compared with 66 per cent. in tuberculosis, while 39 per cent. of the former were over 18,000 and but 13 per cent. of the latter over 15,000. This difference is still more emphasized in the acute cases, which make up the majority seen in hospital practice, the average of osteomyelitis being 22,200 and for tuberculosis 11,400, a difference of nearly 11,000.—*Medical Record.*

PRESENT-DAY OPINIONS OF THE VALUE OF THE SO-CALLED INCLUSION BODIES IN SCARLET FEVER.

BY MATTHIAS NICOLL, JR., M.D.

(From the Research Laboratory, Department of Health, New York City.)

The inclusion bodies described by Professor Döhle, of Kiel, as found in the polymorphonuclear leukocytes of scarlet fever blood, have since become the subject of extensive study in Europe and, to a less extent, in this country. Döhle was of the opinion that these bodies would be found pathognomonic for scarlet fever. Kretschmer, of Berlin, shortly afterward confirmed these findings. Dr. Anna Williams and I also undertook their study at the Research Laboratory of the Department of Health, and came to the conclusion that while Döhle's claim of specificity for them was not justified, since identical findings occurred in a number of other conditions, nevertheless the determination of their presence or absence was of decided value to the clinician in helping him to make a differential diagnosis between scarlet fever and conditions which frequently simulated it. This position we still maintain in spite of the adverse opinion of many observers and of the fact that a more extensive study of very mild cases of scarlet fever and of control cases of other conditions has led to a somewhat lessened regard for their value.

The literature of the subject has now become so extensive that only a cursory review of it is here possible. In general, it may be stated that, with the exception of Kretschmer, Professor Kolmer, of Philadelphia, and ourselves, all the writers have little to say in favor of Döhle's work. Thus Bongartz, of Nuremberg, in a study of 80 cases, including 21 normal bloods, and the remainder of scarlet fever, diphtheria, measles, pertussis and even diarrhea, finds inclusion bodies in 81 per cent. of normal blood, and in 91½ per cent. of the others, and states that in the blood of children inclusion bodies are found in the majority of cases, and that they are greatly increased in febrile conditions and therefore cannot be pathognomonic for scarlet fever. Glomset, in the *Journal of Infectious Diseases* of November, 1912, goes still further, stating that by shaking up normal blood the bodies may be made to increase in number. Contrary to all other observers, he makes no distinction between the so-called inclusions and detached or pediculated portions of the nucleus, notwithstanding the difference in the action of the two toward various stains. He believes that the bodies reach their maximum on the fifth day, which he regards as the height of the disease. The article contains the photograph of measles blood, said to have been from a hemorrhagic case which differs in no respect from the blood seen in an early case of pronounced scarlet fever.

Bélak, of Budapest, believes that only when a suspected case of scarlet fever shows no inclusions in the blood can this disease be excluded, the presence of inclusions in any case having no value for diagnostic purposes. The most recent article on the subject is that of Grainger and Pole, of London, who examined a large number of scarlet fever cases and controls. They find that a carbol methyl blue stain gives better results than the generally used Manson and state that Döhle's inclusion bodies will probably be found in every true case of scarlet fever during the first four days, and that the absence of these bodies practically excludes this disease. They find them, however, in a large proportion of cases of diphtheria, measles and tonsillitis, and therefore believe that they are of no value in making a differential diagnosis between these diseases and scarlet fever. It is stated that a number of measles cases were complicated by bronchopneumonia, but that some uncomplicated cases also showed inclusions. They were not found in toxic rashes, and no cases of German measles were examined. They conclude that it is impossible to diagnose scarlet fever by blood examination alone.

In contrast to these opinions Kolmer, of Philadelphia, is in essential agreement with Kretschmer and ourselves. He first pointed out, however, that in the first four or five days of diphtheria, typical inclusions could be found in quite a large percentage of the cases, and after that but seldom. This fact, which escaped us in our first studies, I have since been able to confirm. He finds inclusions in the majority, but not all cases of scarlet fever in the first few days and regards them of value in diagnosis. Kretschmer, in a second communication in November, reiterates his belief in the value of the bodies, and states that with the exception of septic conditions, those in which they are found other than in scarlet fever are not likely to be confounded clinically with the latter.

This diversity of opinion must be accounted for on other grounds than incompetence or prejudice on the part of the different observers, and I believe is due to the following causes:—

(1) That the majority of workers have chosen to regard a given case as positive if, after prolonged search, one or two

polymorphonuclears show a single body of whatever size or shape, thus using the term in an absolute, rather than in a relative or quantitative, sense. Now it is perfectly true that by examining a great many cells, even in normal blood, an occasional inclusion may be met with. Thus, in a series of twenty bloods from as many supposedly healthy children, Dr. Williams and I, by examining a hundred or more leukocytes in each case, found in two cells one in each of 2 cases, an inclusion, one very small and the other a fair-sized mass.

At the Research Laboratory from the beginning, as a routine, even if arbitrary, method, we have been in the habit of expressing an opinion of a given blood by using a series of plus marks from four to one, according to the number of cells showing inclusions and the total number of inclusions, and the plus minus sign + — to designate a case in which a few are found, but not sufficient to justify a diagnosis.

(2) Many observers have drawn their conclusions solely on the findings in blood sent to the laboratory, sometimes from another city, and without clinical data of the illness from which the patient suffered. From our own experience, I believe that in a study of this kind no really definite conclusions can be reached by such a method. Within a few steps of the Research Laboratory we have ready access to a vast amount of clinical material among the infectious diseases, and the laboratory work has been strictly controlled by the personal study of the patients in nearly all cases which showed unusual blood characteristics, and these have been readily explained by this proceeding. As an example, an infant of nine months showed no inclusions in the blood, and ten days after admission to the scarlet fever service developed typical scarlet fever. Again, a blood smear from a measles case was sent for examination and found to be unquestionably positive. On visiting the patient, I found that it had a marked nasopharyngeal diphtheria, clinically and by culture. These 2 cases from the blood examination alone, and without clinical control, would have sufficed to upset our regard for the value of the bodies. Such instances have been very numerous.

We have continued to study the inclusion bodies during the past year and have now examined 300 to 400 cases of scarlet fever, usually in the active stage of the disease, that is, during the first week. The majority of the smears have come from the scarlet fever service, but quite a large number from private sources for diagnosis, the history of the case being later given to us by the physician.

Up to a short time ago, I was convinced that every case of true scarlet fever up to, and including, the fourth day would show in the blood a sufficient number of inclusion bodies of all types to justify a differential diagnosis between scarlet fever and such conditions as, in my opinion, show no such findings.

During the past winter there have been an unusual number of very mild cases of the disease with very little involvement of the throat, low fever and atypical tongues. In a recent study of 33 such cases, a number of which were examined daily from the first to the fifth day, five showed too few inclusions to justify calling the blood smear positive. Two of these cases were, to my mind, doubtful, and were possible examples of German measles; the others were, undoubtedly, mild scarlet fever. In some instances the inclusions were more pronounced on the third or fourth day than the first.

In a small percentage of true scarlet fever, then, practically negative results may be expected.

Pathologic conditions, which, even in the hands of expert diagnosticians, may justifiably be confused with scarlet fever, are, first of all, sepsis, whether due to surgical or accidental traumatism, or complicating a disease, showing a scarlatiniform eruption, and just as there is absolutely no way at present to differentiate scarlet fever from sepsis by clinical symptoms, so, unfortunately, are the blood pictures identical.

Serum rashes of whatever variety show no inclusions in the blood, and I wish to emphasize at this time that by this statement now and hereafter I mean no inclusions which would serve to confuse this disease with scarlet fever. If such are present in a case of diphtheria, to which antitoxin has been given, and during the first five days of the disease, they may be due either to diphtheria or the streptococcus infection associated with it in the throat; therefore positive findings at this period are of no value. Negative findings practically exclude the presence of scarlet fever. After this period, a positive finding should make us very suspicious of its existence.

Toxic rashes due to other causes than serum show no inclusions.

German measles, so frequently confused with scarlet fever, show no inclusions. This statement is based on an examination of 40 or 50 cases, in several of which there was present a decidedly red throat.

Measles blood is peculiar. In an examination of some 40 cases of uncomplicated measles from the preëruptive stage through the first week, not one has shown a blood picture similar to that of scarlet fever, although it is true that there are regularly present in the polymorphonuclears tiny granules which are quite unlike the relatively large masses found in scarlet fever. For which reason I have no hesitation in stating that the picture of measles blood which accompanies the article of Glomset, already referred to, is misleading as typical of uncomplicated measles, although I have not had an opportunity of examining a case of the hemorrhagic variety, which this was said to have been.

Acute Follicular Tonsillitis.—The necessity for a differential diagnosis between this condition and scarlet fever may occasionally arise, especially when the tonsillitis is accompanied, as it sometimes is, by an erythematous eruption. From the fact that the streptococcus is not infrequently associated with the staphylococcus and other organisms in this condition, one might expect that the inclusion bodies would occasionally be found. The blood examinations in tonsillitis have not been sufficiently numerous to justify a positive conclusion in regard to the matter, yet in the 15 or 20 cases studied no typical inclusions have been found. Another condition of less frequent occurrence and which may best be described as a streptococcus angina, and which clinically resembles very closely, if not exactly, the angina of scarlet fever, cannot be distinguished from the latter by blood examination, as typical inclusion bodies are regularly found. I have seen a number of such cases among the medical staff at the scarlet fever hospital and the nurses, and may state that it is often impossible to classify them clinically. The cases are usually suspected of being diphtheria, a culture is taken and antitoxin given. The cultures show a great predominance of streptococci, then scarlet fever is anticipated and a rash is diligently searched for without result. My personal feeling in regard to such cases is that unless scarlet fever can be absolutely excluded it is safer to regard them as atypical examples of the disease and protect others from exposure until at least a week after the throat has become normal.

That these bodies may be found in certain pneumonias, erysipelas, pulmonary tuberculosis of an active type, typhus fever, and other conditions, is not pertinent to the inquiry regarding their value as a means of differential diagnosis between scarlet fever and a disease resembling it, provided that neither is complicated by one of the diseases mentioned.

This means of differential diagnosis has been put to a practical and very exhaustive test, not only in the diphtheria and scarlet fever hospital services of the city, but in a good many cases in which blood smears have been sent in from private sources, and has given decided satisfaction. As an example of a case in which it would have proved of great service if carried out, I may cite the following: A child became ill with diphtheria, was given antitoxin and isolated from the rest of the family. Ten or twelve days later a scarlatiniform rash appeared on the body with very few constitutional symptoms. Cultures had shown the child to be free from diphtheria, the rash was regarded as due to antitoxin, and she was allowed to return to her brothers and sisters. No blood examination was made. Four days later two of these contracted scarlet fever, and one of them died. The first child also died of scarlatinal nephritis. Here, then, is an instance where two lives might have been saved by a simple procedure not taking more than five minutes to perform.

To sum up, the findings of typical inclusion bodies in a case resembling scarlet fever before the fourth day of the disease may mean scarlet fever, sepsis or severe streptococcal angina. Negative finding practically excludes the existence of scarlet fever In the course of diphtheria, for which antitoxin has been given, positive findings before the seventh day are not diagnostic of scarlet fever. After this time a positive finding in the case of a scarlatiniform rash should make one suspect very strongly the existence of a complicating scarlet fever.

There is at present no short-cut to the diagnosis of scarlet fever. All the clinical symptoms and signs must be taken into consideration in reaching a conclusion, and among them the determination of the presence or absence of inclusion bodies in the blood has a not unimportant place.

BIBLIOGRAPHY.

Döhle Zentralblatt f. Bakt., Bd. 61. H. 1-2 and Bd. H. 1-3.
Kretschmer, Martin. Berl. Klin. Woch., 1912. No. 11; November, 1912, No. 46.
Schwenke, J. Jahr. f. Kinderheilk., Vol. LXXVI., p. 436.
Bongartz, H. Berl. Klin. Woch., November, 1912, No. 45, p. 2,124.
Preisich. Berl. Klin. Woch., 1912, No. 16.
Iskender, Ahmed. Berl. Klin. Woch., 1912, No. 26.
Kolmer. American Journal Diseases of Children, July, 1912.
Glomset, D. J. Journal of Infectious Diseases, November, 1912.
Nicoll and Williams. ARCHIVES OF PEDIATRICS, 1912, No. 5.
Nicoll. ARCHIVES OF PEDIATRICS, 1912. No. 6.
Grainger and Polo. British Journal Children's Diseases, January, 1913.

THE TREATMENT OF SCARLET FEVER WITH INTRAVENOUS INJECTIONS OF NEO-SALVARSAN.*

(*Preliminary Report.*)

BY LOUIS FISCHER, M.D.,

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Because of the presence of a positive Wassermann reaction in some cases of scarlet fever, the thought occurred that neo-salvarsan might offer specific therapeutic results in scarlet fever as well as in syphilis and allied infections of the spirillum group.

Lenzmann, Schreiber, Klemperer and Woita describe advantages in scarlet fever by the use of salvarsan, which would indicate, first, that a decided antipyretic effect is noted soon after the injection, and, second, that there is a decided exfoliation of the necrotic membranes, and that a tendency toward convalescence with the absence of fatal complications has been noted.

The studies have been confined to the mild and some severe types of scarlet fever cases.

At a recent meeting of the German naturalists and physicians, Lenzmann reported[1] a series of results with salvarsan in scarlet fever. Infants received 0.1 gram, older children, 0.2 or 0.3 gram by intravenous injections. Some children required as many as three or four injections.

Schreiber,[2] in the discussion of these cases, reported a rapid disappearance of the necrotic membrane in scarlet fever following the intravenous injections of neo-salvarsan.

Felix Klemperer and Hans Woita[3] report 39 cases treated with salvarsan injections. These authors report a decided antipyretic effect following the use of salvarsan, so that its influence as an antipyretic was suggested in the treatment of other acute infectious diseases.

To test the efficacy of arsenic alone, Fowler's solution was given in scarlet fever without result. It was found that the arseno-benzol was the active agent.

Neo-salvarsan dissolves readily in water. No shaking is necessary; in fact, shaking of the solution may cause oxidation. Nothing else is added. The simplicity of the preparation is in decided contrast to salvarsan.

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* Read before the Section on Pediatrics, New York Academy of Medicine, March, 1913.

For intravenous injection 20 c.c. of freshly distilled water is used to every 0.1 gram of neo-salvarsan, or 0.9 gram is dissolved in 180 c.c. of distilled water. As to the relative strength of salvarsan and neo-salvarsan, 0.6 of salvarsan is equivalent to 0.9 of neo-salvarsan.

Schreiber[4] reported a series of results with infants in doses of 0.15; in nurslings he advised 0.05 gram.

Luksch[5] found that when an intravenous injection of salvarsan was given to animals infected with the streptococcus or the staphylococcus pyogenes, it either arrested the infection or greatly retarded its progress. Clinical observations have, to some extent, verified these experiments, and still positive deductions cannot be made until a large number of cases have been studied.

In a case of osteomyelitis of the femur with a purulent phlegmonous process, in which the preparation was employed as a last resort, marked improvement was noted. In 3 other cases of suppurative phlegmonous processes the fever subsided and the functions of the affected joints were restored in a very satisfactory manner. 0.3 gram or 5 grains was the dose employed. It looks, therefore, as though salvarsan may in future be employed with success against infections other than those produced by the spirillum group.

Nicoll[6] has reported a case of noma in which salvarsan injection was given, and the patient recovered.

Our investigations cover a series of 5 cases. All the cases chosen were septic, and were selected because the prognosis was fatal.

In all 5 cases reported a Wassermann examination was made. Three of these proved negative, one probably positive, one reaction unreported.

All injections were given intravenously. In young infants the size of the median basilic vein was so small that it was necessary to cut down and expose the vein at the elbow to introduce the remedy in these cases. The jugular vein used in the fourth case offers the best means of introducing the remedy, owing to its size and accessibility—we need not expose it.

The dose employed was 0.2 gram dissolved in 40 c.c. of plain sterile water.

Tessie C., nine years old, was ill fourteen days before admission to the Willard Parker hospital. Her temperature ranged between 103°F. on admission to 106°F. Her pulse ranged between 110 and 160. Large cervical suppurating glands with extensive necrosis and sloughing, to which locally antitoxin was applied. She became delirious soon after admission to the hospital, and the prognosis was necessarily fatal. After her fifth day in the hospital, as a last resort, I injected 0.2 gram of neo-salvarsan, intravenously. The only noticeable improvement was an antipyretic effect, a drop of two degrees soon after the injection was given. The child died the following day.

Concettina G., one year and six months old, was ill nine days on admission. Septic scarlet fever, enlarged cervical glands, high-colored urine, twitching of the extremities, profound toxemia, profuse discharge from the eyes and ear, and an irregular pulse. Constant stimulation was required. The temperature on admission was 104°F., the following day 106.4°F. The pulse ranged between 160 and 180. On the seventeenth day of her illness an injection of 0.2 gram neo-salvarsan was given. The temperature rose from 102° to 105° F., and dropped the following day to 100°F. The pulse was irregular. The temperature rose gradually. The case lingered and died on the sixth day after the intravenous injection was given.

Julius R., nine years, six months old, was ill two days before admission. Septic scarlet, gangrene of the right foot, probably due to a thrombus. Prognosis fatal. An intravenous injection of 0.2 gram neo-salvarsan was given on the 3d of February. The general condition improved, and it is but fair to say that the improvement followed the injection of this drug. We were able to amputate the foot after the line of demarcation formed. The operation was performed by Dr. Smith, attending surgeon at the Willard Parker Hospital. The child is convalescing and will be discharged soon.

Lizzie B., three years old. Ill fourteen days before admission to the hospital. Septic scarlet fever, complicated by noma involving the inside of the cheek, fauces and pharynx, extensive sloughing as far as the eye could see. An injection of 0.2 gram was given in the jugular vein with no apparent result. The child died on the second day after the injection was given.

Baby C., three years, six months old. Extensive noma involving cheek, gums, fauces, marked sloughing and fetid odor, 0.2 gram neo-salvarsan was injected intravenously. The following day there was a drop of two degrees in the temperature. The case is still in the hospital, but the prognosis is grave.

Deductions.—Owing to the small size of veins in infants and children, when the median basilic vein was used, it was found necessary to expose it in order to be sure that the injection was properly given. No reaction, such as an acute febrile attack, nor shock, nor rash followed the injection. As no systemic shock or disturbance followed, I am sure that if no good was done, at least, no harm was done.

It is too early to be prejudiced for or against neo-salvarsan in septic scarlet fever, but it merits an extensive trial.

Whether or no antitoxin inhibits the action of neo-salvarsan cannot at present be stated. If one of these 5 cases reported by me can be saved, the drug merits a further trial.

I desire to acknowledge the valuable assistance and coöperation of Dr. Louis A. Sexton, resident physician of the Willard Parker Hospital; also Drs. Green, Holmes, McDonald and Bettinger, of the resident house staff, in the study of these cases.

BIBLIOGRAPHY.

1. Lanzmann. Society Proceedings in Deutsch. med. Wochenschr., No. 39, 1912.
2. Schreiber. Society Proceedings in Deutsch. med. Wochenschr., No. 39, 1912.
3. Klemperer and Woita. Therapie der Gegenwart., May, 1912.
4. Schreiber. Münch. med. Wochenschr., No. 17, 1912.
5. Luksch. Wien. klin. Wochenschr., No. 20, 1911.
6. Nicoll. ARCHIVES OF PEDIATRICS, September, 1912.
7. La Fétra. ARCHIVES OF PEDIATRICS, September, 1912.

ALIMENTARY SACCHAROSURIA IN THE CHILD.—Gaujoux (*Ann. de Méd. et Chir. Inf.*, March 1, 1913) says that in the child, as well as in the adult, saccharosuria may be normal. The child retains proportionally more sugar than the adult. It is not possible in the child to establish absolute figures indicating the saccharocystic capacity. In the normal nursling whatever proportion of sugar is changed by the intestine is taken up by the liver. There are few traces of glycosuria even when saccharosuria is marked. Histories are given of 47 cases. During the first six months of life the intestinal mucosa has the power of absorbing much saccharose. As soon as the limits of usefulness of sugar are lowered the prognosis of the affection in which the phenomenon occurs is made worse. There are two factors, intestinal and hepatic, in the production of saccharosuria.

THE RESULT OF RECENT RESEARCHES INTO THE ETIOLOGY OF MEASLES.*

BY JEROME S. LEOPOLD, M.D.,
New York City.

For many years it was generally believed that the virus of measles was present in the blood and in the discharges of the nose and mouth of infected individuals. However, the definite proof of this hypothesis was only recently evolved.

To briefly review the earlier work, it may be stated that the first attempt to inoculate measles was made by Home in 1758. His results and those of contemporaneous observers were not conclusive, however.

Nearly a century later (1852) Mayr reported that he had infected children with measles by inoculating them with the blood and with the secretions from the nose and mouth of cases of measles. Mayr also showed that the "scales" from a desquamating patient were not infective.

In 1898 Chavigny reported a case of measles in a monkey who had been in close contact with a keeper who had the disease. On the basis of this observation Josias (1898) placed monkeys in a measles ward for several months; it is doubtful, however, if his attempts at transmission of the disease were successful. The attempt to inoculate the monkey with measles was made by Grunbaum, an English observer, in 1904, but the results were negative.

The first important modern advance in the study of the transmission of measles was made by Hektoen in 1905. He successfully reproduced the disease in two adults by inoculating them subcutaneously with blood taken from cases of measles during the first thirty hours of the eruption. This experiment demonstrates that the virus of measles is present in the blood, at least during the early stage of the disease.

In 1910 Anderson and Goldberger began their work on experimental measles by inoculating two Rhesus monkeys with blood from a patient with measles. After an interval of eleven days both animals had fever, but no eruption appeared. The same experiment was again tried with the same result—a rise in temperature, but no eruption. The blood from a third patient was then inoculated into three monkeys. After an interval of ten days a rise in temperature in one of the animals was noted and a few papules were observed on the face. The eruption disappeared at the end of four days, and was followed by a fine scaling. The authors considered this a slight attack of measles.

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* Read before the New York Academy of Medicine, Section on Pediatrics, March, 1913.

In these first experiments of Anderson and Goldberger the blood used for inoculation was taken from measles patients at least twenty-four to forty-two hours after the eruption had been noted. The next series of experiments were conducted with blood taken less than fourteen hours after the eruption had appeared. Two Rhesus monkeys were inoculated. After an interval of ten days a rise in temperature with a typical eruption was noticed. Blood taken from the hearts of these monkeys and injected into other monkeys caused a rise in temperature and a typical eruption in several instances. Anderson and Goldberger attributed the failures in their first experiments to the fact that blood was not taken from the measles cases early enough in the course of the disease. Nevertheless these experiments demonstrated that blood taken from infected individuals some time before the eruption appeared induced a definite rise in temperature when injected into monkeys. Blood withdrawn eighteen hours after the first appearance of the eruption gave a well-marked elevation of temperature with a typical measles eruption, accompanied by coryza, pharyngitis and bronchitis. In some cases broncho- and lobar-pneumonia developed. No definite reaction could be obtained from blood taken sixty-five hours after the first appearance of the eruption, and no reaction at all was obtained from blood taken one hundred and thirteen hours after the first appearance of the eruption. In other words, it was shown that the infectivity of the blood was greatest shortly before the eruption of measles appeared, lasted for about twenty-four hours and then rapidly diminished. Hektoen obtained positive results in man thirty hours after the eruption had appeared; this may be due to the fact that man is more susceptible to the transmission of measles than the monkey.

The positive inoculation experiments of Anderson and Goldberger were confirmed by Nicolle and Conseil, Hektoen and

Eggers, and Lucas and Prizer. Hektoen and Eggers furthermore showed that the blood picture of experimental measles is similar to that of human measles. Lucas and Prizer, in addition to observing the fever, conjunctivitis, rhinitis, and skin eruption described by Anderson and Goldberger were the first to observe typical Koplik spots in experimental measles in monkeys.

In another series of experiments Anderson and Goldberger collected the discharges from the mouth and nose of measles cases twenty-four hours after the first appearance of the eruption. These secretions were applied to the mouth and pharynx of monkeys. Some of the secretion was also injected into the monkeys. Positive results were obtained in both instances.

Three attempts were then made by Anderson and Goldberger to inoculate monkeys with the epidermal scales of measles cases. These results were all negative and confirm the experiments of Mayr in the human being to which reference has been made.

The period of incubation in experimental measles in monkeys varies from five to twenty-two days—the average being six to eight days. The first indication of the disease is a rise in temperature, which remains elevated for four or five days. The eruption usually appears about the third day after the fever. It is similar to the eruption of human cases of measles. Some instances of experimental measles are as typical as one sees in the human being.

As demonstrated by Anderson and Goldberger the virus of measles has some interesting characteristics. It belongs to the so-called ultra-microscopic group, passing through a Berkefeld filter. Dessication is resisted for twenty-four hours. Although some of the infectivity of the virus is retained after being kept at a temperature of 15°C. for twenty-four hours, the infectivity is destroyed by heating to 55°C. for fifteen minutes. On the other hand, freezing is resisted for twenty-five hours. Attempts to grow the virus of measles were unsuccessful in every instance.

A very interesting observation, which, if confirmed, might be of some importance in establishing the etiology of measles was made by Aronson and Sommerfeld a few months ago. These observers found that the toxicity of the urine was much increased in measles. If 2 c.c. of urine from a case of measles was injected intravenously into a guinea pig, the pig died immediately with the symptoms of anaphylactic shock, or else became extremely ill. The urine of patients ill with the "serum disease," or with the so-called "fourth disease," showed the same toxicity. On the other hand, urine from cases ill with scarlet fever, tuberculosis, pertussis and typhoid and healthy children showed no such toxicity.

Very recently Mautner has shown that these conclusions are incorrect. He found that the urine in other infections, and even in normal cases, showed the same toxicity.

In a later communication Aronson and Sommerfeld conclude from a very large series of cases that the "toxicity test" of the urine is a very reliable aid in the differential diagnosis of scarlet fever and measles. Aronson and Sommerfeld are making further experiments to determine, if possible, what causes this toxicity of the urine. Confirmation of this test by other observers is awaited.

In conclusion it may be stated:—

(1) That measles can be experimentally reproduced in monkeys.

(2) That the virus of measles is present in the blood and in the buccal and nasal secretions of infected individuals.

(3) That the virus has not been demonstrated in the "scales."

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SO-CALLED SODIUM CHLORIDE FEVER.—B. Bendix and J. Bergmann (*Monats. f. Kinderhk.*, 1912, Bd. XI., H. 8) have observed the so-called sodium chloride fever, which occurs after saline infusion, and it has appeared to them probable that it is due rather to bacterial infection than to the injection of common salt. They believe that there are in the water used for making the solution saprophytic germs which become virulent after entering the blood and thus produce the fever that follows saline infusion. Therefore they made experiments to ascertain the truth of their belief. They made salt solution out of freshly distilled water and injected it into 17 nurslings. In all, thirty-three injections were made. The temperature was taken frequently during twenty-four hours. Later 12 children received eighteen injections in the same manner. It was found that in the children injected with this sterile solution there was no rise of temperature at all. The authors recommend for the making of normal salt solution the use of distilled water.

RETURN CASES OF SCARLET FEVER.*

BY LEWIS A. SEXTON, M.D.,
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How long scarlet fever patients are to be isolated and quarantined has been a debatable subject for more than three centuries. What I am going to say will not meet with the approval of many present I feel sure, but these are my personal observations covering a period of six years, during which time I have had under my care 10,093 cases of scarlet fever.

In no condition known to the profession is it so difficult to affirm that the period of infection has passed. Realizing this we continue the isolation until the patients are entirely free from nasal, pharyngeal and aural discharges. This necessitates extending the isolation period far longer than would otherwise seem practical, covering a period of eight to twelve weeks or even longer.

I have in mind one child whose nasal and aural discharge persisted for over eight months. We are probably as far from a specific for the disease to-day as we were when Ingrassias first described it. We do know, however, that by individual attention to the toxic cases, the mortality in scarlet fever can be markedly reduced. Our hope for the present lies in preventive measures and constant individual attention to the septic types which are overwhelmed by the absorption of toxins which are liberated along the respiratory and alimentary tract. Particularly does this apply to the nasal, pharyngeal and upper esophageal structures. As we become better acquainted with the morbid conditions which accompany scarlet fever we find the quarantine period in these cases lengthening year after year. While the *Sanitary Code* requires an isolation period of thirty-five days, our period of detention extends over forty-two days on the average. Even with this prolonged isolation period we get a small percentage of return cases, notwithstanding the strictest precautions which are observed.

Our patients are never permitted to leave the hospital so long as a mucous discharge persists. Nasal discharges appearing late in the course of the disease, often long after the period of quarantine has passed, seem in a majority of our infecting cases to have been the source of transmission.

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* Read before the Section on Pediatrics, New York Academy of Medicine, March 13, 1913.

A peculiar feature, and not, as might be expected, a majority of these cases pass through the regular course of the disease uncomplicated. This leads us to believe that the infection may be carried and remain in a quiescent state for weeks and then become active, due in most instances, we believe, to contracting a cold and a subsequent rhinorrhea.

This condition is undoubtedly influenced by the season, as most of these cases occur during the winter months; this too may be explained by the fact that all cases expose themselves more or less after being released from a long detention in the hospital.

During the past three years we have had 16 return cases that were apparently traceable to some member of the family who had been discharged from the Scarlet Fever Hospital. In each of these cases I visited personally their homes and carefully examined the discharged patient, and in every instance I found the discharged patient suffering from a rhinorrhea. In only 2 cases was there present any desquamation and this was slight on the soles of their feet.

I recall the case of R. E., age two years, who had a very mild, uncomplicated type of the disease, was discharged clean, free from mucous discharges, after a detention of thirty-eight days. Four days after her discharge her mother came down with the most virulent type and died three days later.

The case of R. S., age one and a half years, admitted from the Babies' Hospital, where the onset of the disease had been so mild that it was unnoticed until he reached the desquamation stage of the disease, was discharged after fifty-two days uncomplicated. Seven days after his discharge his mother contracted the disease and died the same week. I simply cite these 2 cases to show that a most virulent type of the disease can be contracted from one that is correspondingly mild, and that in a large percentage if not all of the infecting cases the morbid condition present is rhinorrhea or otorrhea.

There is no authentic proof justifying the old and popular theory that desquamation is infectious.

The fact that the infectivity begins prior to and frequently continues long after desquamation has ceased, that desquamation may continue far beyond the infectious stage of the disease, which is proven by the fact that patients covered with desquamation have mixed freely with others without infecting them, leads us to the conclusion that true desquamation plays no part in the transmission of the disease. I would not say this of the early desquamation which occurs in cases where the erythema is so intense that desquamation comes with the disappearance of the sudamina, for in all these cases there is a subsequent desquamation which is undoubtedly the true one and non-infectious.

We believe, and our observations justify this conclusion, that so long as nasal and aural discharges exist just so long will our cases be infective.

POSTCONCEPTIONAL AND HEREDITARY SYPHILIS.—Jean Bobrie (*Etude sur la Syphilis,* etc., Paris, 1912) gives the following conclusions from his study of postconceptional syphilis and heredity of syphilis. In the absence of all treatment we may find placentas that are macroscopically healthy along with children evidently syphilitic. Nevertheless, maternal treatment has a marked effect on placental hypertrophy. The gravity of the syphilis of the fetus bears no relation to the hypertrophy of the placenta. Hydramnios is exceptional. At whatever time of pregnancy the maternal chancre is contracted the fetus is still infected. The degree of infection varies with the time of infection: the maximum gravity, causing macerated fetus, is at the third month; the gravity then decreases. The fetus never receives a true immunity; while there may be no evidence of syphilis the disease is still present in a latent form. Postconceptional syphilis is more serious for the existing pregnancy than for a later one. The fetus is always infected long before the roseola appears; infection occurs as soon as the mother has been attacked by the chancre. The most effective treatment is mercury in the form of soluble salts or pills; gray oil and salvarsan have not so good an effect by far. Hereditary syphilis can only be transmitted to the fetus by way of the placenta; the spermatozoon which contains a treponema cannot fecundate an ovum. Exceptions to Colles' law are not true. Mothers who do not show syphilitic lesions are still infected, the syphilis being latent. Heredodystrophy is a consequence of syphilis, but not syphilis itself; such infants can become infected by syphilis, and it is then transmissible by the germinative cell only.

A PLEA FOR THE MORE FREQUENT USE OF LUMBAR PUNCTURE.*

BY EDWARD JUDSON WYNKOOP, M.D.,
Syracuse, N. Y.

In asking your attention for a few moments on the subject of lumbar puncture, my reason for so doing is to secure your cooperation in bringing this procedure into more common use.

It may seem, to some of you, that a paper of this character should not be presented at a section dealing more particularly with special work, but the diseases of infancy and childhood are so interwoven with all lines of medicine that the impetus gained here by a free discussion will stir us all in an effort to secure for this diagnostic and therapeutic agent the support it needs.

It is my intention to refer in this paper to other than true meningitis and to leave out the use of lumbar puncture in dealing with epidemic cerebrospinal meningitis and those inflammatory conditions caused by pneumococcus, influenza and tubercle bacillus.

There is as yet, on the part of a large majority of the profession, a hesitancy about attempting to do a lumbar puncture, and then frequently only as a last resort.

Evidently the thought of puncturing the spinal membranes seems a difficult feat and too often this important means of diagnosis and treatment is neglected.

It has been demonstrated by Quincke and others that puncturing the spinal canal in the lumbar region is not only comparatively safe, due to the separation of the ends of the cord and the condition of the vertebral arch and spinal membranes, but fairly easy in the average case.

Care must be taken that the patient is in the proper position, with the spine well arched, to give as much space as possible between the vertebræ; then following the general rules laid down in the various works on this subject the puncture is comparatively safe and easy.

No one now hesitates to thrust a needle through the chest wall to verify the presence of an inflammatory exudate, and it seems to me every effort should be made to urge the adoption of lumbar puncture promptly and early when any meningeal irritation of any nature whatever is suspected.

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* Read before the Section on Pediatrics at the Annual Meeting of the New York State Medical Society, Rochester, N. Y., April 30.

The procedure is as free from danger as a thoracic puncture and by many is regarded as safer.

During the past few years it has been my good fortune to see a number of cases in which meningeal irritation occurred alone or accompanied some other disease, as, for instance, some of the various infectious diseases.

In these cases, while one or two symptoms of a true meningitis were lacking, yet there was sufficient evidence of enough irritation, such as headache, muscular rigidity and oftentimes vomiting, to make one feel that a diagnosis was better made after a lumbar puncture had been performed.

In every instance, lumbar puncture was advocated, and in most of the cases the request was granted.

In almost every case the fluid withdrawn was clear, coming out usually under pressure, yet microscopically showed no pathologic elements.

In almost every instance the meningeal symptoms abated within a few hours and did not return.

While most of these cases developed some of the infectious diseases, as, for instance, a pneumonia, yet the meningeal symptoms cleared and stayed cleared after the puncture and the feeling of any uncertainty as to the possibility of a beginning true meningitis developing were at once relieved.

The amount of fluid withdrawn depended somewhat on the amount of pressure present, but always enough to secure a sufficient quantity for laboratory purposes.

It is in this class of cases that it seems to me that with the advent of any meningeal irritation a lumbar puncture should be done at once, not only for diagnostic measures, but for therapeutic reasons as well.

Even if a general anesthetic has to be given the result certainly warrants the slight risk entailed.

Many times, when called in these cases, which show meningeal irritation occurring with some intercurrent disease, you will feel confident that the meningeal symptoms may clear without any special treatment, but there is always an element of uncertainty, and it is much better to know than to guess.

Those who have seen the atypical form of the true meningitis develop insidiously, and a realization of the true nature of the infection arrived at too late, know the regret that has followed the failure to do a lumbar puncture early and to know the true nature of the disease dealt with.

In many of the diseases of infancy and childhood, convulsions and nervous phenomena develop early, accompanied oftentimes with enough meningeal irritation to make us wonder if a serious inflammation of the meninges is not developing.

It is in these cases and in the convulsive seizures of infancy without known causes that early lumbar puncture, it seems to me, should be attempted.

It is my firm conviction that meningeal irritation with or without convulsions, whether due to intestinal toxemia, the advent of some infectious disease or from any cause whatever, should, without doubt, be treated by lumbar puncture.

Besides promptly relieving the brain pressure, it affords at once an opportunity to see the clinical feature of the spinal fluid and to have it examined in the laboratory, which is the only positive means of determining its true character.

It will probably always remain an enigma why some children show more meningeal irritation from trivial causes than others, but we know that certain types of children develop convulsions and show terrific nervous involvement at the least provocation.

It has always seemed to me that some of the cases of convulsive seizure in early infancy, in which a cause was difficult or even impossible to determine, might be cleared up if a lumbar puncture were attempted more often and the spinal fluid subjected to repeated examinations.

Practical experience shows that convulsions occurring late in an infectious disease, such as whooping-cough, are frequently immediately relieved by lumbar puncture.

It is not my thought to discard drugs in treating this type of case. but it has seemed to me that the relief of brain pressure is easier, surer and safer in lumbar puncture than by any other measure.

To sum up:—

The points to be emphasized in particular are these:—

(1) Lumbar puncture is of great value from a diagnostic and therapeutic standpoint in other than true meningitis cases.

(2) It has not yet received the endorsement it should have and it is not used as often as it should be by the general practitioner.

(3) It is the only prompt and sure way to secure a positive diagnosis in cases showing suspicious meningeal symptoms, whether alone or accompanying some other disease.

(4) Therapeutically, by relieving the brain pressure it is much more prompt and effective than drugs.

(5) Many cases showing suspicious meningeal symptoms clear up almost at once after a lumbar puncture.

(6) In the treatment of convulsions from any cause it is a remedy that is of great value.

(7) Its technic is simple and it should be promptly and easily done by the general practitioner.

TREATMENT OF TUBERCULOSIS IN CHILDREN ON THE SHORES OF THE MEDITERRANEAN BY SEA BATHS AND SUNLIGHT.—L. Rebillet (*Ann. de Méd. et Chir. Inf.*, January 1, 1913) describes the treatment given to tuberculous children at Cannes, and other sanatoria on the Mediterranean Sea, as carried out in some cases throughout the winter. Before and after the sea bath most of the day is used for sun treatment, the parts being exposed to the unchanged rays of the sun for from one-half to three hours daily. The head is protected with a large straw hat. Under the influence of the red and infra-red rays there is a reparative action and a phagocytosis which is indirectly microbicidal. In white osteitis, necrosis, lupus and tuberculous ulcerations there are slight redness and swelling and increased suppuration. The skin becomes deeply pigmented, which the author considers a favorable prognostic sign. At once appetite returns and digestion is reestablished and there is a rapid improvement in general health. Adeno-tracheobronchitis at once improves if superficial; the glands separate and decrease in size. After incision of suppurated glands they heal kindly. The author gives histories of 32 cases. He says that sea baths can be given all winter if commenced in October. Heliotherapy without instruments is effective in glandular and osseous disease. It produces cicatrices remarkable for their solidity, suppleness and whiteness. The skin looks normal. Immobilization should be used only when the joints are painful and inflamed. As soon as the articulation becomes painless and indolent the limb should be mobilized and exposed to the sun. As few operations as possible are done. Orthopedic treatment consists of progressive mobilization of the articulations, and massage of atrophied and paretic muscles.

SOCIETY REPORTS.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Meeting, March 13, 1913.

DR. HENRY DWIGHT CHAPIN, CHAIRMAN.

CASE OF MONGOLIAN IDIOT WITH AN ACCOMPANYING CONGENITAL HEART LESION.

DR. FREDERICK L. WACHENHEIM showed this case, a female infant of six months, showing a combination of mongolian idiocy and a congenital heart lesion. The latter consisted of a perforation of the intraventricular septum and open ductus arteriosus. There was slight cyanosis when the child cried, showing that the collateral circulation was not quite adequate. So far as Dr. Wachenheim's experience went, he had never seen the combination of these two lesions, though the presence of these two defects in one patient should not seem very remarkable. The mother stated that another child had a similar cerebral condition.

CASE OF CONGENITAL MENINGOENCEPHALITIS.

DR. WACHENHEIM also presented a girl infant, aged four months, in whom the condition had existed since birth, and the child apparently had not gained in weight. The patient presented periodic convulsions of the extremities, athetosis, associated with an extreme opisthotonos. There was no rigidity or spastic condition of the extremities, but marked rigidity of the neck. The head was markedly contracted, but reacted to light. With these symptoms and localization, the presence of a chronic meningitis of the base, and an encephalitis in the basilar region, probably the optic thalami, was probable. The noteworthy features of the case were the athetosis and the absence of spasticity in the extremities.

THE RESULT OF RECENT RESEARCHES INTO THE ETIOLOGY OF MEASLES.

Dr. Jerome S. Leopold read this paper. (See p. 000.)

THE TREATMENT OF SCARLET FEVER WITH INTRAVENOUS INJECTIONS OF NEO-SALVARSAN.

Dr. Louis Fischer read this paper. (See p. 000.)

PRESENT-DAY OPINIONS OF THE VALUE OF THE SO-CALLED INCLUSION BODIES IN SCARLET FEVER.

Dr. Matthias Nicoll, Jr., read this paper. (See p. 000.)

A CONSIDERATION OF THE DIFFERENTIATION OF THE ERYTHEMA OF SCARLET FEVER AND THAT OF GERMAN MEASLES. DIAGNOSIS. UNPLEASANT COMPLICATIONS FOLLOWING INACCURATE OPINIONS.

Dr. S. Dana Hubbard read a paper on the above subject. He pointed out the difficulty of diagnosing accurately the onset of either of these two diseases, and said there was no condition which so indelibly impressed itself upon the diagnostician as his weakness in these trying moments when time is all-important. First of all the members of the profession were asked to relegate the term scarlatina as a descriptive term for something approaching scarlet or very mild scarlet to oblivion, as frequently by the use of such a phrase the family was lured into false hopes and deceptive conditions.

Scarlet in its onset can assume more disguises than almost any other disease, presenting oftentimes a wide range of conditions with many differing clinical pictures. There are many clinical conditions which more or less closely resemble the onset of scarlet. The very multiplicity of conditions should mark this disease for special consideration above all others. This disease should be prominently in our minds when called to see a child with a rash. The speaker had seen sore throats with negative initial cultures, where no rash was observed for days, show desquamation in two to three weeks' time. An invariable rule in the Department of Health is to follow up cases of negative diphtheria to see if they do not peel in a few weeks' time. It is *not* the case that very mild cases do not amount to much. Very severe scarlet has followed several mild cases. It is an invariable rule never to dismiss any rash in a child until it has had at least forty-eight hours of development, unless its associated clinical symptoms make the diagnosis clear. A mild scarlet unrecognized and untreated is most often the very commencement of an epidemic; it is frequently the cause of lesions in the patient which last throughout life, deforming and disfiguring. Classical scarlet is ushered in with sudden vomiting or nausea, weakness, headache, sore throat, faucial redness, quick and high tension pulse, tongue coated, as with skimmed milk, enlarged and tender glands in neck. A general pink punctate erythema, the scarlet mask almost positive in its significance. Later the strawberry tongue. But all the cases do not appear so well outlined. These symptoms vary in degree and sequence and, in some, do not appear at all. Our natures differ. Some will express quickly while others will as readily suppress. Individual symptoms are variable. With this considered it is but small wonder that it is difficult to recognize scarlet at its onset. Scarlet in certain epidemics will assume one rôle and in another epidemic or locality will assume another rôle, which adds to the confusion. He who makes a positive diagnosis on the rash alone is going to fail more often than he is going to succeed. It may be intense, faint, universal, localized, smooth, uneven, uniform in distribution or in groups, erythematous, or ecchymotic, last for a few hours or for a week or more. Never appears on the face. Appears quickly, subsides slowly. Itching most intense in the areas where miliaria develop. The rash never starts to desquamate on the day of subsidence, but starts to peel about the twelfth to the twenty-fourth day of the disease, and it takes from thirty-five to fifty days to complete the work. The peeling is not characteristic. In those cases where there is no peeling by the twenty-first day the diagnosis was in error.

In German measles the speaker could not impress too strongly the care that should guard every opinion expressed before it is fully confirmed by lengthy observation. Scarlet should be always prominent in our mind. The care and protection of the patient and others should be as rigid as if the diagnosis was positively scarlet.

A characteristic case develops as follows: Children usually from four to ten years—though no age is exempt—are the ones attacked. Slight sneezing, slight dry cough, slight malaise, later flushed face.

When compared with scarlet, the constitutional symptoms are very slight and the severity and intensity of the rash are in inverse proportion to the constitutional symptoms; enlarged post-cervical glands like a chain of beads early in onset; they are soft and not tender. There is a non-confluent dark-red (violaceous) rash. Rash maculated, in scarlet punctated. Onset sudden, but not severe. Tongue and pulse not affected. Rash starts about nose and upper and lower lips, while in scarlet it appears first on neck about clavicular spaces; the mask is typical, circumoral pallor. There is no vomiting. Rash appears in one part at a time, appears gradually, at other parts fading at place of onset. Covers body in about twenty-four hours. The German measles rash fades with a brownish red to a light brown and disappears, leaving no mottling of the skin. Scarlet rash fades with yellowish shading, leaving skin more or less injected. The desquamation is furfuraceous in about three days. Has no sequelæ and itching is not present. German measles is not contagious from onset to termination, simply infectious. It occurs, as a rule, in epidemics and is much less infectious than ordinary measles. Never observed in infants under one year. One attack, as a rule, confers immunity. Incubation variable from five days to not more than four weeks, usually from fourteen to eighteen days. Stage of invasion lasts from a few hours to about two days. Macules are of two varieties—morbilli type and the more severe form with intense eruption resembling scarlet.

In conclusion: There is no one disease, excepting none, whose control and abolishment would confer a greater or more lasting impression upon mankind than the control and abolishment of scarlet. Of all the world's scourges of both modern and ancient times there are none that can claim the ravages through death and deformity that will outnumber scarlet. Prompt recognition, practicable segregation, careful and continued isolation with prompt and thorough disinfection, with attention to "carriers," and we will in a remarkably short time control this one great pest.

DISCUSSION.

Dr. W. P. Northrup wished to take one or two exceptions to the remarks of Dr. Hubbard. The latter said that German measles was never a severe disease. This is not so in young adults. I recall a case in such an individual who had a temperature of 104°F. and delirium, and it took three attendants to control him. I remember a child I treated through genuine measles and then treated for German measles and the whole family was treated for the same condition. The child was as sick with one as with the other. Dr. Hubbard said that German measles were not contagious. I would like to take exception to that also. The house physician of a contagious disease hospital visited his sister, who was entertaining a party of friends, and the whole family and all the friends came down with German measles. The period of incubation in this case was positively fourteen days. We are very glad to hear that desquamation in scarlet fever is not contagious. In hospitals we fear less and less the contagiousness of scarlet fever. We make the diagnosis as soon as possible. I feel that you can quarantine scarlet fever in the ward and I would not hesitate to place a case of diphtheria in one bed and scarlet fever in the adjoining one, and alternate them down the whole ward. They could be treated successfully, so convinced am I that the contagiousness of this disease is limited to sneezing distance. The old bogy of the scales of scarlet being sent in a letter and infecting a friend at a great distance is exploded.

Dr. Hubbard said that German measles are quite epidemic. It is easy to make a differential diagnosis of German measles and scarlatina. The essential difference is the enlargement of a chain of glands, like a row of beads, on the anterior border of the trapezius. These glands are not enlarged in the early stages of scarlet fever. They are not enlarged in measles. Of course, we could go through a long description of both diseases, but that is the pathognomonic symptom, and if you get it you are dealing with German measles.

Dr. Henry W. Berg did not see the use of treating scarlet with injections of salvarsan. Whenever we obtain a specific for one disease someone will try to treat other diseases with it. When diphtheria antitoxin first came out some tried to treat cerebrospinal meningitis with it, forgetting that if there was no specificity to diphtheria antitoxin it would be worthless. Those days are gone when a man could get up and say, "Potassium iodid in my hands given in this and this case gave good results." What is the use of using a specific like salvarsan in the treatment of scarlet fever? The logical reason is that you get a positive Wassermann in scarlet fever, and this seems ridiculous, unless the patient has congenital syphilis. We must avoid the use of specific remedies for conditions for which they are not specific.

Dr. H. B. Sheffield said that there was one symptom characteristic of German measles which had not been mentioned, namely, sweating. The speaker had found this very pronounced in all of his cases.

Dr. Minor said that Noguchi examined 300 to 500 cases of scarlet fever for Wassermann. Only 1 case gave a positive test, and that child had bullæ.

Dr. Hubbard recalled the unique case of Philomena K. She was thought to have cow-pox after vaccination. But it proved to be a true case of small-pox. The diagnosis of German measles is not easy. Some of the cardinal symptoms are not as prominent in German measles as they are in our minds. The enlarged glands may be due to pediculosis. The appearance of the cardinal symptoms and time to study and observe the rash may make the diagnosis of German measles positive, but doubtful cases should be treated as scarlet until they are definitely proven otherwise.

Dr. Sexton wished to call attention to the color of the lesions in German measles. In a good light a violaceous color will be seen, not present in scarlet or measles.

RECENT INVESTIGATIONS INTO THE ANTITOXIN CONTENT OF THE BLOOD IN CASES OF DIPHTHERIA AT DIFFERENT TIMES.

Dr. William H. Park said that until three years ago injections of diphtheria antitoxin were given almost wholly subcutaneously and very often a second or third injection was given. From a study of the absorption of antitoxin it seemed to me that a single dose only was the proper method of giving the antitoxin. Some months ago some charts were shown at the general meeting of the Academy of Medicine showing the absorption curve in a number of cases of diphtheria in which 10,000 units were given at a single injection subcutaneously. He wished to add some charts of more recent experiments, as well as to refer to those previously detailed.

Absorption from subcutaneous tissues of normal men:—

Four men were injected subcutaneously with 10,000 units of antitoxin. Two of these received an injection containing 9 per cent. proteid and two received injections containing 18 per cent. Two of these men after an interval of five weeks were reinjected, the one previously receiving the concentrated proteid antitoxin solution receiving the lesser amount of proteid, and the one receiving the lesser amount, the greater amount. No difference was manifest in the absorption of the greater or lesser concentrated proteid. The variations in the individual men were proven by the reinoculation to be due to the individuals and not to the proteid concentration of the antitoxic solution. In all the men the increase of antitoxin in the blood was quite rapid for the first twenty-four hours and reached its height at the end of forty-eight to seventy-two hours. The antitoxin content of the blood then gradually decreased. The tests showed the same in every case of diphtheria tested. The antitoxin was slowly absorbed from the tissues and increased in the blood for forty-eight to ninety-six hours. The intravenous injections, however, give the full amount of antitoxin in the blood immediately. As we studied these cases shown in the charts we noticed that, as a rule, the antitoxic content of the blood is proportional to the weight of the individual and to the dose injected. It is important to remember that we give the large doses of diphtheria antitoxin not because there is much toxin in the blood, but because we want to push the antitoxin rapidly into the blood and from the blood out to the tissue fluids, so that not only local tissues inflamed, but also the general tissue cells throughout the body, may be bathed in the antitoxin.

In animals, after they have received an intravenous injection of toxin, it is necessary to give the antitoxin within a couple of hours if life is to be saved. In malignant cases, therefore, life may sometimes be saved by an intravenous injection in which the subcutaneous would fail.

The average dose given at the Willard Parker Hospital is 5,000 units for a mild case, 10,000 units for a laryngeal or moderately severe pharyngeal case. In malignant cases 20,000 units intravenously is advised. Only one injection is given. We have never had a fatal case due to the immediate effects of antitoxin. We would hesitate, however, to give an intravenous injection to a child that had had some weeks previously an immunizing dose. We would not hesitate to give it subcutaneously. We have never known of a death from the second injection. In New York about one death has occurred in each 100,000 primary injections.

CURRENT LITERATURE.

ABSTRACTS IN THIS NUMBER BY

DR. CHARLES E. FARR.	DR. WILLARD S. PARKER.
DR. ALFRED F. HESS.	DR. J. F. SAMMIS.
DR. JEROME S. LEOPOLD.	DR. RICHARD M. SMITH.
DR. WM. A. MURPHY.	DR. S. W. THURBER.

DISEASES OF EAR, NOSE AND THROAT.

SMITH, S. MACCUEN: A CONSIDERATION OF OTITIC MENINGITIS IN CHILDREN. (*Annals of Otology, Rhinology and Laryngology,* December, 1912, p. 933.)

The article is a plea for the early operation for the prevention and treatment of meningitis and other complications of aural disease. Primary meningitis *per se* is a rare occurrence. Of the two types of this disease, one is characterized by slight but persistent headache, somnolence, malaise, restlessness and irritability with little temperature; the other is distinguished by severe initial symptoms and a rapid succumbing to the infection. Headache is apt to be local at first, but is persistent. The ear is often not suspected until some discharge is seen. In 5 cases between the age of five and eight all had suffered from acute suppurative otitis with spontaneous rupture of the drum membrane; each had mastoid tenderness; the pneumococcus was the predominating germ. A fatal onset occurred in each of these patients in less than fifty-two hours. The lamentable fact in these cases was that it was not recognized until too late that there was anything more than a "running ear." The logical conclusion, therefore, is the prompt investigation of every prophylactic means at our disposal. Our only hope lies just here and, if surgery is demanded, operate early. S. W. THURBER.

THEOBALD, SAMUEL: ANTISEPSIS RATHER THAN ASEPSIS IN THE TREATMENT OF OTITIS MEDIA PURULENTIA. (*Annals of Otology, Rhinology and Laryngology,* December, 1912, p. 1,025.)

The common dictum that the quantity of the fluid used to irrigate a running ear is more important than its chemical nature, is held as untrue by the author. For the last twenty years he has been using solutions of bichloride in strengths from 1 to 8,000 and increasing to 1 to 4,000, as the most efficacious means of treatment. The ear is wiped out and the solution (warmed) poured into the canal, filling it and allowed to stay in about ten minutes, while the patient is placed in a comfortable position. The solution is then allowed to run out, the ear dried about the orifice and a bit of cotton closes it. The frequency of the application depends on the effect produced, but never more often than once in twenty-four hours. As the great majority of cases of acute otitis media, if not purulent at the start, become so in spite of aseptic precautions, when the membrane is either incised or ruptures of itself, it is the best plan to begin by antiseptic treatment. S. W. THURBER.

SOBOTKY, IRVING: PERSISTENT MOUTH-BREATHING FOLLOWING ADENOIDECTOMIES. (*Boston Medical and Surgical Journal,* February 13, 1913.)

The writer points out that "habit" is not the cause of failure to establish nasal breathing by adenoidectomy in many cases, but that abnormal nasal conditions producing some degree of obstruction account for the persistence of the symptoms. Besides the common lesions a cause often found is the high palate from delay in operation. In these cases no relief will be obtained until dental treatment results in spreading the arch and regulating the teeth. A discussion of methods for relief of the condition brings out the following:—

(1) For the cure of persistent mouth-breathing the nasal breathing exercises have not proved efficient.

(2) Operative treatment of the nasal condition is indicated.

(3) Patients should have the adenoid removed before the typical high palatal arch is formed.

(4) If this high arch is formed the treatment should be dental.

(5) Cutting a slice of mucous membrane from the enlarged lower turbinates, as an aid to nasal respiration, has given good results.

(6) A submucous resection should not be done in children under sixteen, for the reason that the result upon the development of the nose cannot be foretold.

(7) Electrolysis is effective in reducing enlarged turbinates, but is not suited for children. WILLARD S. PARKER.

PAGE, J. R.: CASE OF CONGENITAL BILATERAL MICROTIA, WITH TOTAL OSSEOUS ATRESIA OF BOTH EXTERNAL AUDITORY CANALS. (*Annals of Otology, Rhinology and Laryngology,* December, 1912, p. 1,079.)

This patient was a boy about four years of age, whose father was fifty-three when he married and his mother thirty-three, making a difference of twenty years in their ages. There is no history of deafmutism or any deformity in either family. Ten days after marriage the father suddenly died from cerebral hemorrhage. The child was first seen when seven weeks old and had been watched by the author of the article for two years. At the end of this time there seemed to be some hearing. X-ray plates were thought to demonstrate a tympanum and ossicles. An operation on one ear was thought wise in order to give the child all the benefit possible in the development of speech and if improvement was noticed the other ear was to be operated upon.

Upon operation the bony meatus was found wanting, a small dimple marking its site. No evidence of a fibrous canal was present. The mastoid cortex was then removed and every cell beneath was found filled with a thick mucopurulent fluid. A fair-sized antrum was found to be filled with the same material and from this a small aditus led to a contracted middle ear. In order to keep this tract open a large radical operation was done and skin-grafted. The eustachian tube was found patent. A large meatus, of greater diameter than one-half inch, was cut in the rudimentary auricle. A caloric test after the operation was positive.

Now, two years since the operation, the meatus admits a fair-sized speculum, the interior of the cavity is clean, the hearing has decidedly improved and his appreciation of words and sounds is increasing. S. W. THURBER.

WRIGHT, GEORGE H.: THE TEETH AND THEIR RELATION TO THE BODY. (*Boston Medical and Surgical Journal,* February 13, p. 232.)

Tonsils are lymphoid structures. Diseased teeth may be a source of infection and enlargement of glands and tonsils.

Tonsils become enlarged without infection or disease whenever (*a*) the first group of temporary molars at two years of age are in process of eruption; (*b*) at six years, when the first permanent molars, and at twelve years, when the second molars are active in eruption.

When there has been no previous history of recurrent tonsillitis and tonsils are simply enlarged, the periodicity of the eruption of teeth should be considered. WILLARD S. PARKER.

PATHOLOGY.

Mallory, F. B., Hornor, A. A., and Henderson, F. F.: The Relation of the Bordet-Gengou Bacillus to the Lesion of Pertussis. (*The Journal of Medical Research,* March, 1913, p. 391.)

In a previous report reviewed in the Archives, Mallory and his co-workers showed that there is a distinct lesion in whooping-cough, consisting in the presence of masses of minute bacilli between the cilia and the epithelial cells lining the trachea and bronchi. In the present report the authors detail experiments showing that they have produced this lesion in puppies by means of cultures of this bacillus; that they were able to obtain pure cultures from these puppies, and were again able to produce the disease by means of these pure cultures. Infection was best accomplished by dropping some of the culture fluid into the nares. However, in several cases natural infection was brought about by subjecting normal puppies to contact with others who had the disease. These experimental results, taken in conjunction with the pathological data previously reported, seem to settle without doubt the etiology of whooping-cough from a bacteriologic and pathologic standpoint, and render the path clear for discovering a suitable antitoxin or vaccine. Alfred F. Hess.

Carpenter, Howard C., and Gittings, J. C.: Coagulation Time of the Blood in Infants and Children. (*American Journal of Diseases of Children,* January, 1913, p. 1.)

The authors review the theories of coagulation and discuss the methods of determining the coagulation time. They have adopted the following technique and find it most satisfactory. The blood was obtained from a finger, since it was found to be much easier to control than any other locality. First, the wire loops were cleaned in the flame of an alcohol lamp. The skin of the finger was washed with tincture of green soap and distilled water and then with 95 per cent. alcohol. Puncture was made deep enough to permit the free flow of blood. The first drop was wiped off with a dry cotton pledget, and then the distal loop filled from the second drop, care being taken not to touch the skin. The excess blood was then wiped off, and the second loop filled from the third drop; the third loop from the fourth drop, etc. The only variable factor is the thickness of the film of blood in each loop. Since small drops permit of securing too thin a film, care should be taken to secure a large, free-flowing drop. When all the loops were filled the rod was at once introduced into the warm air chamber above the water in the glass tube. Within a definite time after the puncture of the skin—usually four to five minutes—the rod was gently lowered until the distal loop entered the water. Coagulation was considered to be complete only when the structure of the clot within the loop remained intact. It frequently happened that a very small amount of pigment would dissolve out of the coagulum.

By this method they investigated the coagulation time of 160 patients, making 29 examinations on healthy infants with an average time of 9.4 per cent. minutes, and in patients having some disease 135 cases were examined with an average time of 9.7 per cent. minutes. There was marked variation in the same infants at different times and they believe that this makes the drawing of trustworthy conclusions impossible. They also believe that the various diseases which showed average differences can be considered of no real importance. They believe that the inconsistencies of various observers is unduly large. They advocate further study on the problem of coagulation with a view to the determination of the presence or absence, increase or diminution of one or more elements concerned in the formation of thrombin and in the latter's action on fibrinogen.

RICHARD M. SMITH.

KOPLIK, HENRY, M.D., AND CROHN, BURRILL B., M.D.: FAT AND NITROGEN METABOLISM IN A CASE OF CONGENITAL ABSENCE OF THE BILE DUCTS, WITH A STUDY OF FERMENTS OF THE PANCREATIC SECRETION AND THE FECES. (*American Journal of Diseases of Children,* January, 1913, p. 36.)

The case studied was one of pure absence of the bile ducts without any anomaly of the stomach or intestines. It was found that the nitrogen metabolism was normal but the fat metabolism was greatly disturbed. The absorption was only 48.4 per cent. as against the normal of 88-96 per cent. Splitting and saponification of fat also is interfered with. Pancreatic ducts are patent and the pancreatic secretion is of normal strength, but the lipase formation is weak in action because of the absence of bile salts.

RICHARD M. SMITH.

DEBUYS, L. R., M.D.: A STUDY OF THE WASSERMANN REACTION IN CONNECTION WITH HEREDITARY SYPHILIS. (*American Journal of Diseases of Children,* January, 1913, p. 65.)

The author discusses the study of the Wassermann reaction in both mother and child and concludes that in instances where it is difficult to obtain the blood of the infant the examination of the mother's blood will suffice. Frequently a mother apparently normal can be proved to have syphilis in a modified form by the presence of the Wassermann reaction. The negative reaction does not exclude syphilis, as it may be drawn before the antibodies appear in the circulation or later, when there is a temporary disappearance of the antibodies due to the presence of the spirochetes in the fibrous lesions only. Scarlet fever, leprosy, trypanosomiasis and scleroderma may give positive Wassermann reaction. Aside from these a positive Wassermann means syphilis. RICHARD M. SMITH.

SURGERY.

SMITH, CARROLL: THE CONGENITAL ABSENCE OF RIBS. (*Journal of the American Medical Association,* March 22, 1913.)

Smith's patient was first seen at four days of age and died when eight days old. She was apparently perfectly developed. except for a deformity of the left thorax, where a transverse furrow was seen just below the left nipple, extending from the vertebral column to the sternum. The flexed upper extremity fitted accurately into this depression and the author believes that the pressure of this extremity explains the absence of the ribs. The bulging and retraction was very marked on crying and the heart pulsations could be felt at the upper part of the depression. At the postmortem examination the left first, second and third ribs were normal, except that they seemed jammed together and compressed laterally. The fourth and fifth ribs were fused. About 1.5 cm. of the sixth rib with its cartilage was found free in the thoracic wall without connection to the vertebral column or sternum. The seventh and eighth ribs and their cartilages were entirely absent. The ninth, tenth, eleventh and twelfth ribs were floating. The xiphoid process was bifid. Other congenital defects were present, notably a patent ductus arteriosus, an open foramen ovale and a scaphoid scapula. Syphilitic periarteritis was also present. CHARLES E. FARR.

MORTON, C. A.: RESULTS OF EXCISION OF HIP JOINT IN 34 CASES OF SUPPURATING TUBERCULOUS DISEASE. (*British Medical Journal,* February 15, 1913.)

Morton operated by the anterior route, making his incision below the anterior superior spine and between the sartorius and the tensor fasciæ femoris and then between the rectus and the gluteus minimus. The head of the bone was excised along with all the diseased tissue, and, although the wounds were drained, healing took place in most of the cases within two months, this being to the author's mind the great advantage of excision over treatment of the abscess alone. These cases were seen years after the operation and the results were noted. In nearly all cases flexion was present to a right angle, but lateral movement in abduction was quite limited in some cases, was fair in others, and in one was nearly perfect. Shortening increases steadily after the operation up to two inches or more, and in one case was four inches, the stump of the neck riding up on the ilium. The joints are very unstable and the limp is usually quite marked, even with the use of an extra sole. The patients were able to walk a considerable distance and in the more favorable cases even many miles. Deformity recurred in one case without recurrence of the disease eight years after operation and was removed by weight extension. Morton thinks the range of motion. at least, is better after excision than it would be after conservative treatment of the abscess alone.

CHARLES E. FARR.

PARKER, CHARLES A.: SURGERY OF THE THYMUS GLAND. (*American Journal of Diseases of Children,* February, 1913.)

The author reports the operation on 50 cases of enlarged thymus. He discusses at considerable length the physiology and pathology of the gland and its relation to Graves' disease and also the technique of the operation. The indications for operation may be divided into two groups of cases, the first characterized by permanent dyspnea and the second characterized by attacks of dyspnea with freedom from symptoms in the intervals. The first form is usually seen in very young infants. Often the suffocative attacks last ten or fifteen minutes. They come frequently, and between these attacks there is often dyspnea and stridor. In these patients there may be arching forward of the manubrium sterni and percussion may show definite evidence of hypertrophy of the thymus. A negative X-ray does not absolutely rule out the condition. Sometimes there is inability to swallow. Operation is imperative in these cases. The second type occurs in older children who are quite normal early in life. The first attacks come on usually without warning and are sometimes several months apart. When the diagnosis can be made definitely operation should be resorted to. Intracapsular thymectomy is the only type of operation now employed. The vertical median incision terminating about 1 cm. below the upper border of the sternum is the skin incision usually employed. General anesthesia is well borne when competently given. The operation is easily and safely performed.

RICHARD M. SMITH.

MARTIN, WALTON: ARRESTED DEVELOPMENT OF THE FOREARM FOLLOWING OSTEOMYELITIS IN CHILDHOOD. (*Annals of Surgery,* February, 1913, p. 259.)

Martin's patient had an osteomyelitis of the radius when she was a year old, for which she was treated for five years. When first seen by Martin the girl was fourteen years of age, and the affected forearm was about one-fourth the size of the sound one and was curved to the radial side. The hand on this side corresponded in size to that of a child of three. The X-ray showed that the shaft of the radius was exceedingly small and thin, while the ulna was fairly well developed, but markedly curved to the radial side. The ulna was divided and the forearm straightened, but the result was not good and another operation was done two months later, removing a wedge from the ulna and doing a plastic on the soft parts of the radial side. Massage and passive motion were begun at eight weeks and the patient soon began to use her hand. When presented at the age of twenty the hand had increased to about one-half the size of its fellow, and she is able to use it in sewing and in her daily work.

CHARLES E. FARR.

MORRIS, ROBERT T.: UNILATERAL HYPERTROPHY OF THE ARM. (*Annals of Surgery,* February, 1913, p. 268.)

In Morris' patient, a girl, it was noticed at birth that one arm was larger than the other. This disparity in the size of the two arms has increased gradually and is now very marked, at the age of nineteen. The right arm is two and one-half inches longer than the left and more than three inches greater in circumference and is still increasing in size. The bones, soft tissues and blood vessels all seem to be involved and the condition is apparently angiomatous in its nature. In the discussion of the case Dr. Moschcowitz said that the condition was one of partial gigantism or "Riesenwuchs," is of congenital origin and of angiomatous type, involving both the bones and soft tissues, particularly the venous system. CHARLES E. FARR.

ALEXANDER, EMORY G.: TREATMENT OF VOLKMANN'S CONTRACTURE. (*Annals of Surgery,* April, 1913, p. 555.)

Alexander reports 2 cases of Volkmann's ischemic paralysis in children, aged six and ten years respectively. Both followed fractures at the elbow which had been treated with anterior right angle splints and tight bandaging. Both were treated by the author with his special method of extension, with a cure in the first case and a relief of the contracture but persistence of the atrophy in the second. His apparatus consists of a leather casing for the lower half of the forearm, reinforced on each side by a steel bar, and a semicircular bar at the upper end of these. A metal plate covered with leather is then fitted to the palm of the hand and fingers and by means of straps, side braces and thumb screws slow forcible extension is applied. The apparatus is applied with the hand strongly flexed and the fingers extended as far as possible. The only difficulty encountered was superficial pressure ulceration of the finger tips due to too rapid extension of the fingers.

In the discussion of Alexander's paper Dr. G. G. Davis reported 2 cases in which tendon lengthening was necessary to complete the cure, after treatment by apparatus had been thoroughly tried. Dr. F. T. Stewart reported 1 case in which he had obtained a partial cure by tendon lengthening, and Dr. Jopson a case in which improvement had not been very marked, as the muscles were badly degenerated. Dr. Gibbon had had 1 case of Volkmann's contracture where no splints and no bandage were used, the forearm simply being placed in complete flexion. The contracture apparently was due to the swelling in this case.

CHARLES E. FARR.

SCHMIDT, W.: DUODENAL ULCER IN INFANTS. (DAS ULCUS ROTUNDUM DUODENI IM ERSTEN LEBENSJAHR.) (*Berlin. klin. Woch.,* March, 1913.)

According to Schmidt duodenal ulcer is more common at postmortem in infants than in any other period of life. He found these ulcers in 20 out of 1,109 cases, or 1 $^{8}/_{10}$ per cent., while in autopsies on 2,715 cases past the age of one year only 17 showed duodenal ulcer. The infants with duodenal ulcer died of wasting diseases, such as rachitis, nephritis, tuberculosis, marasmus, etc. In 1 case two ulcers were found; in 1 five, and in 2 instances three. These ulcers were of different ages apparently. Fourteen of the cases had given no symptoms during life. In 1 case the ulcer was healed. CHARLES E. FARR.

ROLLESTON, J. D.: CONGENITAL RENAL AND URETERAL ANOMALY. (*British Journal of Diseases of Children,* April, 1913.)

Report of the absence of right kidney, renal artery, veins and suprarenal; the ureter was present and ended blindly; the left kidney was considerably enlarged. This was found at the autopsy of a boy twelve years old, who died from diphtheria. There were no other congenital abnormalities, except the reduplication of the ureter on the left side. WM. A. MURPHY.

MEDICINE.

POYNTON, J. F.: SOME CASES OF JAUNDICE IN CHILDHOOD. (*British Journal of Diseases of Children,* April, 1913.)

The author divides his cases into groups, the first being those dating from birth—somewhat prolonged and apparently obstructive. They are apparently not of the same nature as icterus neonatorum. He notes the absence of splenic enlargement, the slight jaundice, the natural consistence of the enlarged liver.

The second group is of alcholemic type, which runs in families, with an acholemic jaundice, enlargement of the liver and spleen and anemia of varying degree. There are two varieties—one a persistent mild jaundice, the other has outbursts of very definite and extreme jaundice.

Under the third grouping are cases syphilitic in origin. Practically all of the cases gave a history of "fits" prior to the onset. The mortality of these was rather high. WM. A. MURPHY.

WILLIAMS, TOM A.: HYSTERICAL PHOBIA IN A CHILD; THE PRINCIPLES OF THE TREATMENT. (*British Journal of Diseases of Children,* April, 1913.)

A boy, aged eight years, developed "hallucinations," which occurred when he was alone. They were accompanied by a loud cry and twisting backward of the neck and contortion of the body. Mother was of the hysterical type and father said to have had similar attacks. The case proved to be a phobia against being alone. Recovery was complete, following the accustoming of the child to going out alone, and to going to sleep without anyone in the room. The author also gives some suggestions for treatment of such conditions in children.

WM. A. MURPHY.

ARONSON, H., AND SOMMERFELD, P.: A LATER COMMUNICATION ON THE TOXICITY OF THE URINE IN MEASLES AND OTHER INFECTIOUS DISEASES. (*Deut. Med. Woch.,* March 6, 1913, No. 10, p. 455.)

In an earlier paper the authors showed that the toxicity of the urine was much increased in measles. If 2 c.c. of urine from a case of measles was injected intravenously into a guinea pig the pig died immediately with the symptoms of anaphylactic shock, or else became extremely ill. The urine of patients ill with the "serum disease" or with the so-called "fourth disease" showed the same toxicity. Urine from cases ill with scarlet fever or other diseases and healthy children showed no such toxicity. On the other hand, Mauntner failed to confirm these results.

In their latest communication Aronson and Sommerfeld report that a guinea pig weighing 180 to 200 grams can be injected intravenously with 3 to 4 c.c. of urine from a healthy patient without any ill effects. They consider a urine abnormally toxic if a guinea pig weighing from 180 to 200 grams dies after an injection of 2 c.c. of urine intravenously.

One hundred and forty-six cases were tested for toxicity by this method; 18 normal urines showed no toxicity; 33 out of 44 urines from measles cases were toxic and caused the death of the guinea pigs tested.

Only 1 case of scarlet out of 20 cases showed any toxicity. The cases of diphtheria tested also failed to show any toxicity. All the urines from "serum disease" cases showed toxicity. Almost all other diseases were negative. The authors consider that the negative cases obtained in measles were due to the fact that the urine was tested too late in the course of the disease.

This toxicity test can be used as an aid in the differential diagnosis of measles and scarlet fever.

Aronson and Sommerfeld's results have been confirmed in the Children's Clinic of Düsseldorf by Schlossman and Bauer.

The authors are as yet undecided whether the toxicity of the urine is due to some mineral substance, as, for instance, a potassium salt, or whether it is due to some specific organic element. The answer to this problem is to appear in a future communication. Further confirmation is awaited.

JEROME S. LEOPOLD.

KNIGHT, BOYCE W., M.B., L.R.C.P.: ACUTE GASTROENTERITIS IN YOUNG CHILDREN. (*American Medicine,* January.)

The exposure of infants to the extreme summer heat is, in the opinion of Dr. Knight, the determining factor in causing gastroenteritis. Milk in the same bacteriologic condition as that which we find in the summer, when given to a baby in the cooler time of the year, in the vast majority of the cases we should not find cholera infantum as a result. The intestine falls an easy prey to irritation and infection after the child has been exposed to a continued high temperature.

By the use of a diet consisting of veal or chicken broth, barley water, or one of the dried cereal-containing milk foods, Dr. Knight was able to eliminate any marked loss in weight. This diet was continued throughout the heated season.

J. F. SAMMIS.

STORCK, J. A.: RECURRENT VOMITING. (*New Orleans Medical and Surgical Journal,* January, 1913.)

In a series of 20 cases 88 per cent. occurred after the fourth year. Nervous phenomena sometimes resembling the aura of epilepsy were present in 80 per cent., and the same number were of neurotic parentage. Painful joints were present in one case.

Adenoids or enlarged tonsils were encountered in 4 cases, their removal seeming to lessen the attacks of vomiting. The examination of the feces gave no especial information. In a large percentage of the cases the first and subsequent attacks were of sudden onset, the child being in apparent perfect health at the time of onset.

The prodromal symptoms were: Listlessness—easily aroused, but quickly lapsing back into an apathetic state. Temperature varied between subnormal and 104°F. Vomiting began without warning, consisting at first of food, later of gastric juice and occasionally mucus. Vomiting occurred frequently, as often as every fifteen minutes.

The diagnosis was made by the presence of acetone, diacetic acid or B-oxybutyric acid in the urine.

Especial stress is laid upon keeping the child free from mental and physical fatigue as a prophylactic measure and the exhibition of sodium bicarbonate between attacks.

During the attacks colonic irrigation with sodium bicarbonate, and later its administration by mouth, seemed to be of value.

J. F. SAMMIS.

PARK, WILLIAM H.: ANTITOXIN ADMINISTRATION. (*Boston Medical and Surgical Journal,* January 16, 1913.)

The author emphasizes the importance of immunizing members of the family in which a case of diphtheria occurs, and calls attention to the importance of repeating the immunizing dose in ten days if danger of infection still exists. This repetition is necessary on account of the rapid elimination of antitoxin produced in one species, when put in another species of animal.

There is great divergence of opinion as to the therapeutic dose of diphtheria antitoxin, some regulating the dose according to size of the patient, some according to age, others according to the severity of the disease. From clinical observations at the Willard Parker Hospital, in New York, and the Kingston Avenue Hospital, in Brooklyn, it appears that amounts of antitoxin beyond 25,000 units in a child, and 50,000 in an adult, are unnecessary and useless, and that an initial dose of 10,000 in a child and 20,000 in an adult is probably sufficient for the whole course of the disease.

The writer believes it important to give all the required antitoxin promptly and usually in a single dose, as the effect depends primarily upon the concentration at any one time rather than the total amount of antitoxin and because the absorption from subcutaneous injection is slow, the maximum concentration not being reached for three or four days. Size and weight, therefore are important factors and a child of 80 pounds, therefore, needs a greater dose than one of 40 pounds. The fact that doses larger than necessary do no harm and lead to better treatment is emphasized.

In very severe cases of diphtheria and of tetanus the intravenous administration of refined antitoxin is advised.

WILLARD S. PARKER.

WEBER, F. PARKES: MULTIPLE CALCIFICATION IN THE SUBCUTANEOUS TISSUE. (*British Journal of Children's Diseases*, March, 1913.)

A girl, aged seven years, gave a history of nodules, noticed first twelve months previous. Since then many new ones had appeared. These large, hard nodules were in subcutaneous tissues of the extremities, and adjacent portions of the trunk. Face, head, thorax and abdomen were practically free. The nodules are about the size of a pea, do not give rise to any pain or tenderness. There is a slight enlargement of the lymphatic glands. Examination otherwise is negative. The calcium index of the blood was found to be 1.36 as against a normal average of 0.9. Family history is negative. X-ray and chemical examination show that nodules are principally composed of calcareous material, the larger being formed by coalescing of smaller ones. They do not resemble calcified tuberculous foci or gummata. Skiagrams show no evidence of calcification of lymphatic glands or viscera. Wassermann and von Pirquet reactions were both negative. Dr. Weber classifies it as a case of "calcinosis."

WM. A. MURPHY.

MILLER, R., AND ORTON, G. H.: A CASE OF PATENT DUCTUS ARTERIOSIS WITH SKIAGRAM. (*British Journal of Children's Diseases*, March, 1913.)

An abnormality of the heart was recognized at birth; the patient is now eleven years old. There is no history of cyanosis at any time. Has had occasional attacks of pain around the heart, and is rather short of breath on exertion. Heart is dilated both to right and left. There is a distinct double thrill over pulmonary area, but no diastolic shock. Blood pressure in radial arteries is 104 mm. in right and 110 in left. There is no definite evidence either by sign or symptom of any associated malformation. Patency of the ductus existing alone is one of the rarer lesions in congenital heart disease.

WM. A. MURPHY.

SPAULDING, EDITH R.: VULVOVAGINITIS IN CHILDREN. (*American Journal of Diseases of Children,* March, 1913.)

Some of the results from the special clinic for vaginitis at the Children's Hospital in Boston are reported. The vaccine was used in 35 cases, 14 of which were acute. The average number of doses was 11 and time of treatment three months, though some extended over eight months. In only 6 cases did she get negative smears and entire clearing up of discharge, and 3 of these had a return within two years. There was no better success with autogenous vaccines.

Conclusions are: All cases of vaginitis with persistent discharge are primarily due to the gonococcus. It may extend over many years, with periods of latency of eighteen months. Although it may remain local it is liable to any of the complications seen in adults. The most efficient treatment does not insure a permanent cure. WM. A. MURPHY.

LADD, W. E.: TOXICITY OF BILE, WITH REPORT OF AN UNUSUAL CASE. (*Boston Medical and Surgical Journal,* January 30, 1913, p. 116.)

Ladd reports the case of a girl, five years old, in whom injury resulted in the rupture of a bile duct with consequent escape of considerable quantities of bile into the peritoneal cavity. The bile remained in the abdomen for three weeks and yet at operation no lesions presented except adhesions between the omentum and peritoneum. Bunting and Brown, in experiments on rabbits, found a very toxic and fatal effect from bile injected into the peritoneal cavity which resulted in necrosis of every type of tissue with which it came in contact, while they also found evidence of toxic effect on remote organs, as the heart and kidneys.

The case reported shows that whatever the effect may be of animal bile in the abdominal cavity of animals, a large quantity of bile may escape into the abdominal cavity of the human being without marked pathologic changes, though it may cause marked toxemia, vomiting and spasmodic pain. WILLARD S. PARKER.

RUBIN, I. C., M.D., AND LEOPOLD, J. S., M.D.: ON THE CAUSE OF THE PERSISTENCE OF GONORRHEAL VULVOVAGINITIS IN CHILDREN. (*American Journal of Children's Diseases,* January, 1913, p. 58.)

The authors discuss the chronicity of vaginal infection in infants and find that in cases with considerable amount of pus the vaginal portion of the cervix is particularly infected. They believe that it is important to determine the extent of the deep lesion before active treatment is begun and for this purpose, as well as for medication, advocate the use of the electric light female urethroscope. If irrigations are to be used the top of the catheter should be introduced at least one and a half inches. They do not believe that applications by swabs are efficacious. The chronicity of the infection is due to the close proximity of the portals of entry and the tender mucosa and epidermis and because once started the infection develops in a closed tube, owing to the close contact of the vaginal walls. Adhesions and crypts in the mucosa form favorite places for the bacteria to lodge.

RICHARD M. SMITH.

STOLL, HENRY FARNUM, M.D.: DIAGNOSIS OF ENLARGED BRONCHIAL GLANDS. (*American Journal of Diseases of Children,* December, 1912, p. 333.)

The author believes that a moderate enlargement of the bronchial glands often gives physical signs of sufficient distinctness to render their diagnosis possible by clinical methods alone. X-ray pictures are of aid in confirming auscultation and percussion signs. The signs are usually most marked in the interscapular space, where tapping and percussion elicit bronchial node dullness. Whispered bronchophony in this region is the earliest and most valuable sign of enlarged bronchial glands, especially in children. The spasmodic, brassy cough is also important. If there is fatigue, anorexia, afternoon temperature and slight loss of weight and the signs of bronchial glands, the presumption is that the glands are tuberculous. RICHARD M. SMITH.

MURPHY, W. W., M.D.: HELMINTHIASIS IN CHILDREN. (*American Journal of Diseases of Children,* December, 1912, p. 378.)

The author examined the stools macroscopically and microscopically in 102 children under twelve years of age. They were almost entirely of Russian Jew parentage, but of American birth. Seven of these, or 6.8 per cent., showed the presence of parasites, 4 trichiuris trichiura, 2 ascaris lumbricoides, 1 tenia saginata, and 1 trichimonas intestinalis. In none of the cases was there any anemia. The red count was normal and the eosinophiles were increased in only 3 cases. There was a true eosinophilia in 1 case of trichiurus trichiura. There were no constant set of symptoms present that could justly be referred to the presence of the worms. RICHARD M. SMITH.

KOCH, HERBERT: TUBERCULOUS MENINGITIS. (*Zeits. für Kinderhk.*, April 2, 1913, p. 263.)

From Pirquet's clinic in Vienna Koch has written an admirable monograph on "Tuberculous Meningitis" which should be read in the original by all who are interested in the subject.

Koch's conclusions are as follows:—

SYMPTOMS: (305 cases were observed.)

(1) *Vomiting* was observed in almost 50 per cent. of 305 cases as the initial symptom. Vomiting was also observed very often during the entire course of the disease.

(2) *Headache* was also a very common symptom.

(3) *Restlessness* was usually seen in the later stages of the disease.

(4) *Grinding of the teeth* was frequently observed.

(5) *Constipation* was noted in 132 cases.

(6) *Psychic disturbances* may appear before any other symptoms are noted.

(7) *The sensorium* is usually clear a few weeks before death.

(8) *The convulsions* are similar to those seen in Jacksonian epilepsy. Convulsions were noted as an initial symptom in 18 cases. In most of the cases convulsions were observed in the last week of the disease.

(9) *Opisthotonos* was seen in 90 per cent. of the cases. The symptom usually appeared in the last week of the disease.

(10) *Kernig's sign* was seen in 80 per cent. of the cases.

(11) *Dermography* was positive in 94 per cent. of the cases. It is therefore the most constant symptom.

(12) *Paralysis.*—Paralysis of the facial nerve was the most frequent. The type of paralysis is almost always flaccid. In only 1 case was a spastic paralysis noted.

(13) *Sensation* was normal in only 13 per cent. of the cases.

(14) Reflexes were not at all constant. The patellar reflex was increased in 90 cases, lively in 52 cases, just obtainable in 52 cases, and absent in 36 cases.

(15) *Temperature* was not constant. The temperature was elevated in every case.

(16) *Bradycardia and arrhythmia* were very constant symptoms (71 per cent.).

(17) *The general condition* was almost always very poor.

(18) *Posture.*—In most of the cases the children lie on their side.

(19) *The skin* is usually pale and dry. Scrofuloderma were seen in 8 cases. Lichen scrofulosorum in 2 cases. Tuberculides in 15 cases.

(20) *The glands* are usually small and not tender.

(21) *Pulmonary* involvement was seen in one-third of the cases.

(22) *The abdomen* is usually retracted.

(23) *The liver* was enlarged in 37 cases and *the spleen* in 23 cases.

(24) *Eye.*—Conjunctivitis and keratitis were often seen. The eye grounds were examined in 64 cases. In 14 cases the fundus was normal. In 42 cases papillary changes were noted. In 8 cases choroidal tubercles were observed.

(25) The *pupils* in most cases were dilated. Very often, especially in the late stages of the disease, unequal pupils were observed.

(26) *Otitis media* was noted in 10 cases.

(27) *The fontanel* was usually distended.

(28) *Nephritis* was never present.

(29) *Incontinence* of urine and feces was noted in a few instances.

(30) *Lumbar Puncture.*—In 67 cases the fluid was clear; in 152 cases slightly turbid; in 14 cases very turbid. In nearly every case a mononuclear leukocytosis was observed. Tubercle bacilli were observed in only 16 cases out of 44.

(31) *The Pirquet reaction* was positive in 74 per cent., negative in 21 per cent., and doubtful in 5 per cent. of the cases.

COURSE AND DURATION:—

(1) The *onset* of the disease is, as a rule, gradual.

(2) The *duration* of the disease is longer in older children than in infants—2.6 per cent. of the cases lasted one week, 18 per cent. two weeks, 29 per cent. three weeks, 26 per cent. four weeks, 5 per cent. five weeks, 4 per cent. six weeks, 1 per cent. seven weeks.

PROGNOSIS:—Although some cases of cures are reported in the literature of tuberculous meningitis, all of Koch's cases ended fatally.

THERAPY:—Therapy is entirely symptomatic.

JEROME S. LEOPOLD.

THERAPEUTICS.

LOWENBURG, H.: PROCTOCLYSIS AS A CURATIVE AND PROPHYLACTIC AGENT IN PRIMARY AND SECONDARY ACUTE NEPHRITIS IN CHILDREN. (*Pennsylvania Medical Journal,* December, 1912.)

Basing his views entirely upon the results obtained in 2 cases of nephritis, 2 of typhoid fever, 3 of scarlatina and 1 of intestinal intoxication, the writer comes to the following conclusions:—

(1) Sodium chlorid does not increase water retention in nephritis.

(2) Sodium chlorid inhibits the toxic agent producing the nephritis.

(3) Alkalies assist the action of the neutral salts.

(4) All other symptoms of acute nephritis, the edema, the urinary findings and the subjective features can be made to disappear, or are prevented, by a combination of alkalies and sodium chlorid.

(5) An acute nephritis is benefited by large doses of water.

(6) A convenient way of administering sodium chlorid is by proctoclysis. An advantage of this method is the large amount of water absorbed which, during elimination, reduces kidney acidosis.

(7) Edema is no contraindication to the use of sodium chlorid.

(8) In the treatment of acute infectious diseases and toxemic states, before and after ether anesthesia, it is recommended to place the patient on proctoclysis with normal saline solution, together with the administration of alkalies, to prevent the occurrence of nephritis. J. F. SAMMIS.

BAMBERGER, ARRIE, M.D.: THE VACCINE THERAPY OF WHOOPING-COUGH. (*American Journal of Diseases of Children,* January, 1913, p. 33.)

The vaccine was made from deep swabbings of the throat in children having pertussis, each cubic centimeter containing 20,000,000 dead organisms. The cultures were plated and replated until a pure culture was obtained, and the vaccine made from several strains of the bacilli so that it is polyvalent in character. The vaccine was injected hypodermically in the gluteal region. There were no constitutional effects and only in one case was there any local reaction. The author concludes that the treatment seems to lessen the severity of the disease and abort complications but not to shorten the duration. The sooner the treatment is begun the better the results. He advises the use of large doses, 500,000,000 given every day.

RICHARD M. SMITH.

ALLEN, AMERICUS R.: THE USE OF TUBERCULIN IN TUBERCULOUS ADENITIS OF THE NECK. (*New Orleans Medical and Surgical Journal,* December, 1912.)

Using Koch's old tuberculin, and starting with an initial dose of 2 minims and increasing 2 minims at each injection until serial dilution No. 5 was reached, the following conclusions were made:—

(1) That the use of tuberculin has a decided curative effect in all cases of tuberculous cervical adenitis. (2) That prompt removal of offending tonsils and adenoids, with proper treatment of the teeth, is essential. (3) That tuberculin causes a decided gain in weight and the general health is markedly and rapidly improved. (4) That discharging sinuses and wounds remaining from broken-down glands heal quickly. (5) That operative removal of these glands is to be deprecated, as the tuberculin treatment is efficacious and much more beneficial.

J. F. SAMMIS.

FREEMAN, ROWLAND GODFREY, M.D.: SERUM TREATMENT OF PNEUMONIA. (*American Journal of Diseases of Children,* December, 1912, p. 383.)

The author used pneumococcus serum obtained from the New York Board of Health and injected patients ill with pneumonia with doses at first of 100 c.c. and later 50 c.c. of pneumococcus serum and 50 c.c. streptococcus serum. The ages varied from two months to three and a quarter years. Many cases showed an immediate change in the appearance. Children who looked septic, apathetic, pale, with blotched complexion, turned a good color, took their feedings better and seemed much improved, though the condition in the lungs was unchanged, perhaps spreading. Other cases apparently were not influenced. There was usually some reduction in the leukocytes, but the percentages of polynuclear leukocytes was diminished. The injected patients who lived had a much shorter average course and the mortality was slightly less than the controls. He believes that pneumococcus serum presents a safe method of attempting to influence the course of the disease and that the addition of the antistreptococcus serum has no advantage over the pneumococcus serum alone. RICHARD M. SMITH.

INFANT FEEDING.

BURNET, JAMES: THE DRIED MILK DISPENSARIES OF BRUGES. (*The Child,* December, 1912.)

After investigating the use of dried milk in Bruges, which is prepared at Baron Peers' factory at Oostcamp, according to the Hatmaker process, Burnet thinks dried milk the best infants' food until germ-free cow's milk can be obtained.

It possesses the advantages that it is germ-free and cannot convey, in particular, the tubercle bacilli. Infants reared upon it are almost never affected with diarrhea and dyspepsia. It is cheap and easily prepared.

In Bruges, where Baron Peer finances two dispensaries, the influence of dried milk as compared with other milk appears striking. In 1910 the infant mortality for the entire town was 146.3 per 1,000. In this year 200 infants attended the dried milk dispensaries, and of these 5 died, giving a death rate of 25 per 1,000.

Dr. Miele, at Ghent, had the following results: In 1903 he used sterilized milk and the death rate was 140 per 1,000. When, in 1908, he substituted dried milk the rate fell to 34 per 1,000. Diarrhea and dyspepsia were rarely met with.

J. F. SAMMIS.

HEIM, P., AND JOHN, M. K.: CASEIN-FAT MILK IN INFANT FEEDING. (*Monats. für Kinderhk.,* April 4, 1913, p. 621.)

The authors have come to the conclusion that malt soup and buttermilk feedings are of great benefit in certain cases of infants, but that they can both be used only for a limited time. Finkelstein and Meyer's eiweissmilch, because it is difficult to make properly, and because it is very expensive if bought made, has also a limited field in infant feeding.

Heim and John have devised a new milk which is very easy to make and which, according to the authors, gives very excellent results. This milk is called "casein-fat milk" and is made as follows: The casein and fat of two-thirds of a quart of milk are finely mixed with two-thirds of a quart of water. To this is added one-third of a quart of full milk and from an ounce to an ounce and a half of a dextrin and maltose preparation. The preparation of this milk is somewhat similar to eiweissmilch, but no buttermilk is used in its preparation. It contains 2.14 per cent. proteid, 2.35 per cent. fat and 1.8 per cent. sugar. One quart of this milk contains about 5,000 calories. In older infants the casein and fat from ½ quart of milk are taken, and to this are added ½ quart of water and ½ quart of full milk and about 5 per cent. sugar. This last milk contains 700 calories to the quart. It has 3.05 per cent. proteid, 2.9 per cent. fat, 2.7 per cent. sugar.

This "casein-fat milk" has been used with very good results by the authors in a great number of cases, both as a diet in normal infants and as a therapeutic agent in gastroenteritis. At times constipation is met with which can be cured by using cane sugar instead of the dextrimaltose preparation. This milk of Heim and John is used in the same way as eiweissmilch.

JEROME S. LEOPOLD.

LITZENBERG, J. C., M.D.: LONGER INTERVALS FEEDING OF PREMATURE INFANTS. (*American Journal of Diseases of Children,* December, 1912, p. 391.)

The author reports the feeding of premature infants from birth on four-hour intervals. His results show that premature babies may be successfully nourished with long interval feedings and with a minimum of digestive troubles. By this method the amount of care that the babies require is greatly reduced and for that reason, since they require less handling, they make better progress. The relatively large amount of nourishment required at each feeding can be taken without trouble, the weight increases as rapidly as by the other methods, the intervals of sleep are longer. He believes that four hours is the best interval for feeding premature infants. RICHARD M. SMITH.

MORSE, JOHN LOVETT: THE EFFECT OF THE PASTEURIZATION OF MILK ON BABIES. (*Boston Medical and Surgical Journal,* October 10, 1912, p. 510.)

Pasteurization at 140°F. for twenty minutes destroys pathogenic organisms and therefore diminishes the incidence of diarrheal diseases caused by bacteria. Recent work at the U. S. Agricultural Experiment Station makes it seem probable that the bacterial flora of pasteurized milk is not different from that of raw milk; it also showed that the rate of multiplication of bacteria is the same in pasteurized as in raw milk.

The ferments in the milk are not destroyed, but as a rule but little weakened by pasteurization at low temperatures.

The bactericidal action of cow's milk is weakened, but not destroyed, by pasteurization for one-half hour from 140° to 149° F.

Laboratory experimentation as to the relative digestibility of sterilized, boiled and raw milk is inconclusive. There is very little evidence as to the relative digestibility of pasteurized and raw milk, but what little there is tends to show that the pasteurization of cow's milk at low temperatures has no effect on its digestibility, while pasteurization at slightly higher temperatures apparently makes it more, rather than less, digestible.

The results of animal experimentation are inconclusive. Few metabolism experiments as to the relative utilization of the various elements in raw and heated milk have been carried out in infants and most of these with sterilized instead of pasteurized milk. The results of these experiments are contradictory, but it seems probable that there is little difference in the utilization of raw and pasteurized milk.

The experience of clinicians in France and Germany advances strong, but not conclusive, evidence that the heating of milk is harmless. Variot, during the twelve years subsequent to 1892, found no rickets among 3,000 infants fed on milk sterilized at 108°C. Variot says nothing as to scurvy. Carrel found rickets in 31.8 per cent. of 210 babies fed on ordinary milk, but found the disease in only 15 per cent. of 373 babies fed on sterilized milk. None showed scurvy. These statements are open to doubt, for if the babies in France are like the babies in America, at least 80 per cent. of those of the hospital class show signs of rickets. At that time French physicians were not familiar with scurvy. Since they have learned to recognize the disease it is evident from the number of cases reported that it is much more common in France than was formerly supposed. Finkelstein fed a series of babies on cooked and raw milk of the same modification and found no essential difference in the development and condition of the babies. There have been in this country no comparative studies of large series of babies fed on pasteurized and raw milk.

All large series of cases of scurvy show that a considerable proportion were fed on heated milk, more of them on sterilized, boiled or scalded than pasteurized. It is believed by many, therefore, that the heating of milk is the most important single factor in the etiology of scurvy. Others believe that it is not the heating but the composition of the milk which is at fault, because scurvy sometimes develops in babies fed on breast milk and not infrequently in those fed on raw milk. The results of the analysis of the series of cases collected by the American Pediatric Society, the longest single series on record, are quoted by different writers as proof on both sides of the question.

Replies to a circular letter addressed to the members of the American Pediatric Society make it evident that there is no unanimity of opinion among them as to the effect of the pasteurization of milk on its digestibility and as to whether it renders it less suitable for the feeding of infants.

From the evidence at present available the author concludes that it is impossible to determine whether or not babies fed continuously on pasteurized milk thrive as well as those fed on raw milk, or whether or not the continuous use of pasteurized milk predisposes to the development of diseases of nutrition. There is evidence to show, however, that if the continuous use of pasteurized milk is injurious to babies its possibilities for harm are much less than those of bacteria. All but the cleanest milk should, therefore, be pasteurized before it is given to infants. There is, on the other hand, sufficient doubt as to the innocuousness of pasteurized milk to justify the avoidance of pasteurization whenever the character of the milk warrants it.

WILLARD S. PARKER.

BENDIX, B.: SUGARS IN ARTIFICIAL INFANT FEEDING. (*Zeits. für Kinderhk.*, April 9, 1913, p. 467.)

Milk sugar, according to Bendix, should not be used at all in infant feeding. It is expensive and causes dyspeptic stools, which are soon made normal again when cane sugar is used instead of the milk sugar. The dextri-maltose preparations are much better than milk sugar, but are also expensive and should be reserved for sick infants or for infants that do not gain weight on cane sugar.

Cane sugar, according to Bendix, is the sugar of choice in feeding normal infants. JEROME S. LEOPOLD.

MISCELLANEOUS.

NOTABLE FEATURES ON THE PROGRAMME OF HYGIENE CONGRESS.

The Fourth International Congress on School Hygiene, and the first to be held in America, at Buffalo, August 25th-30th, according to an announcement of the Executive Committee, will be by far the most elaborate effort yet made in this country toward getting the problem of school hygiene before the world. The first International Congress was held at Nuremberg in 1904, the second at London in 1907, the third at Paris in 1910.

The objects of the Buffalo Congress are:—

(1) To bring together men and women interested in the health of school children.

(2) To organize a programme of papers and discussions covering the field of school hygiene.

(3) To assemble a school exhibit representing the best that is being done in school hygiene.

(4) To secure a commercial exhibit of practical and educational value to school people.

(5) To publish the proceedings of this Congress and distribute them to each member.

In addition there is a plan on foot to effect a permanent organization for the purpose of carrying out school hygiene reforms in all the individual communities in this country, if not all over the world.

One of the interesting features of the Congress will be the presence of delegates representing the community interest in school hygiene, including those appointed by mayors and governors, by women's clubs, by school boards, boards of health, by mothers' congresses and charity organization societies and boards of trade. Their help is being solicited with a view of organizing the community in a campaign of school hygiene reform.

The programme committee announces a programme of two hundred and fifty papers and fifteen symposiums, taking up hygiene from the following points of view:—

I. The hygiene of school buildings, grounds, material and up-keep.

II. The hygiene of school administration and schedule.

III. Medical, hygienic and sanitary supervision in schools.

The contributors to the programme make up a notable list of speakers, college presidents and professors; state, city and county commissioners of education; teachers and superintendents of public schools, medical college professors; state, county and city health officers; physicians in private practice, engineers and architects.

Special discussions are being arranged on the following subjects:—

"School Feeding," arranged by the Committee on School Feeding of the American Home Economics Society.

"Oral Hygiene," arranged by National Mouth Hygiene Association.

"Sex Hygiene," arranged by the American Federation of Sex Hygiene.

"Conservation of Vision in School Children," arranged by the Society for the Prevention of Blindness.

"Health Supervision of University Students," arranged by Dr. Mazyck P. Ravenel, University of Wisconsin.

"School Illumination," arranged by the Society of Illuminating Engineers.

"Relation between Physical Education and School Hygiene," arranged by the American Physical Education Association.

"Tuberculosis among School Children," arranged by the Society for the Prevention of Tuberculosis.

"Physical Education and College Hygiene," arranged by the Society of Directors of Physical Education in Colleges.

"The Binet-Simon Test," arranged by Professor Terman, Stanford University.

"The Mentally Defective Child," arranged by Dr. Henry H. Goddard, Vineland, N. J.

Various citizens' committees of Buffalo are arranging an elaborate entertainment for the benefit of visiting delegates. There will be receptions and a grand ball, a pageant of school children, and excursion trips to the great industrial plants of Buffalo, and to the scenic wonders of Niagara Falls. The Boy Scouts will act as official guides.

Delegates will attend from every college and university of note in this country, from other leading educational and hygienic institutions and organizations, and from every country in which an active interest is being shown in the welfare of school children, which includes all the leading nations of the world.

The Congress is open to all persons interested in school hygiene upon the payment of a fee of five dollars. Application for membership should be sent to Dr. Thomas A. Story, College of the City of New York, New York City.

President Wilson has accepted the honorary office of patron of the Congress. The president of the Congress is Mr. Charles W. Eliot, of Harvard University. The vice-presidents are: Dr. William H. Welch, of Johns Hopkins University, and Dr. Henry P. Walcott, president of the recent International Congress on School Hygiene and Demography, and chairman of the Massachusetts State Board of Health.

TUBERCULIN DIAGNOSIS IN CHILDREN.—N. Stricker (*Monats. f. Kinderhk.*, 1913, Bd. XI., H. 10) discusses the value of inoculations in the diagnosis of tuberculosis in children. The condition in most infants is an acute one; that the condition is also generally fatal would lead to the belief that infants are poor antitoxin builders or that the disease is more virulent. In the author's tests a comparatively small number of children were inoculated. His conclusions are that while the tuberculin reaction is supposed to be a specific one, there is great divergence between the results of the tuberculin reaction and the clinical and pathological observations. A positive tuberculin reaction in an infant is an excellent evidence of the presence of an active tuberculosis; in older children it is only a presumptive evidence of an earlier tuberculosis. Negative reaction in infants or children is no positive evidence of absence of tuberculosis. The skin reaction is positive in other acute diseases, such as pneumonia and measles. Children with the exudative diathesis give most positive reactions. There is no relation between the intensity of the reaction and the severity of the infection. A careful, critical observation of the temperature reaction is necessary, since it is present in so many other conditions in children. The so-called "herd-reaction" is seldom seen, but is a positive indication of tuberculosis. A positive cutaneous reaction is of less value than the subcutaneous. The subcutaneous reaction is not altogether without danger, while the cutaneous reaction is perfectly safe. The value of the tuberculin reaction has been overestimated and must always be checked by the symptoms and general condition of the child.

ARCHIVES OF PEDIATRICS

JUNE, 1913

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EDITORIAL.

SCHOOL HYGIENE.

The Conference on School Hygiene, which is to be held at Buffalo in the fall, a notice of which was printed in the May ARCHIVES, will probably be one of the most important and one of the most fruitful meetings of recent years. The meeting will be a busy one and the program is long, as must needs be from the nature of the subject in hand.

The study of school hygiene and the realization of proper school hygiene are worthy of the best mental effort of anyone and can do much to make effectual the work of health departments throughout the general community.

If we are to take children away from outdoor air and play and confine them indoors for a period each day, we have no right to do so unless we give them in exchange a place that approximates in healthfulness the great out-of-doors and where the lack of freedom is compensated by the instruction given. Not all our school buildings meet this standard. Some are unsafe, some are unsanitary, some are badly lighted, some are inadequately ventilated, some are located in noisy and dusty neighborhoods, some are too hot, some too cold, in some the drinking water is impure, in others the toilets favor the spread of typhoid or dysentery and the breeding of flies, in few is there sufficient play space.

These are only a few of the ways in which a school plant may be unhygienic and where the science of school hygiene studies the problem and offers solutions. These leave out entirely the question of medical inspection of scholars and the remedy of such defects as adenoids and decayed teeth, which are detriments to proper intellectual advancement and vigorous health.

All such problems must be solved by the pedagogue and the school architect before they should be willing to allow children to spend a good part of their day studying within doors. Not every child can stand the usual school hours and for not every child is it wise and profitable to have him in school the whole time. Mr. Dresslar* in his excellent book makes the significant and, to the physician, pleasing statement: "The results of experiments with open-air schools prove beyond doubt that abundant fresh air is vital to the needs of children, while experiments with half-day sessions in school, followed or preceded by a half-day of open-air work and play, prove that for many children much time is now wasted in full-time schools and their normal development is retarded. Our schools are still cursed with the doctrine that teaches people to neglect their bodies, and even to mortify their flesh in order to gain spiritual control and to subdue their passions. It would be a great blessing if the Greek ideal of physical and spiritual unity could be reëstablished in the world and the dogma of educational disconnectedness banished forever."

See p. 479.

"The child is father of the man." Teach proper care of his person, his habitation, his excretions, and the child will carry with him knowledge that will raise the level of health in the cities of the future. Send him home with the ideas of fresh air and plenty of it; let him tell his mother that at the school bath he was put to shame because of the raggedness of his underclothes; make him a fighter against flies and the accumulation of filth and you have introduced into each home an agent for the improvement of the sanitary conditions of the adult of today. There is no more persistent individual, nor withal more logical, than the growing child. He has no fear, nor disinclination, alas! to say that things are dirty or that people are dirty, and if only he has been rightly instructed at school he may become a veritable nuisance to the unhygienic. All of which helps on the cause we are all in the last analysis striving for, the lessening of disease, dirt, discomfort, unhappiness *and* doctors.

THERAPEUTICS OF UNCONTROLLABLE HEMORRHAGES IN YOUNG CHILDREN.—Kurt Bluhdorn (*Berlin. klin Woch.,* January 6, 1913) believes that whenever we have an uncontrollable hemorrhage in an infant we have to do with a case of changed coagulation reaction. The blood no longer coagulates in the normal manner. The author recites 3 cases of uncontrollable hemorrhage of three different types in infants. The first was a case of melena neonatorum; the second of purpura abdominalis; the third of septic bleeding of the navel. In the treatment of these cases the author made use of the injection of serum, and as diphtheria antitoxin was at hand he employed that for the injections. Whipple has shown that coagulation is less than normal in melena neonatorum. In the author's case of abdominal purpura the coagulation was very slow and in the case of umbilical hemorrhage coagulation was also delayed. Whipple found fibrinogen and lime salts present in melena, therefore absence of thrombin is probable in that condition. This was probably the case in purpura. The results of the serum injection were excellent and all three of the author's cases recovered. The doses used must be large. Lime salts were used in connection with the serum injections.

ORIGINAL COMMUNICATIONS.

AMAUROTIC FAMILY IDIOCY.*

BY ISADOR H. CORIAT, M.D.,
Boston, Mass.

The mental diseases in children which lead to a severe grade of dementia are juvenile general paralysis, some forms of hereditary syphilis of the nervous system, family cerebral diplegias and the various types of amaurotic family idiocy. Two cases of the latter disease have recently come under observation and these, in addition to an analysis of some cases collected from the literature, have led to certain observations on the essential hereditary nature of the disorder and its comparative racial psychopathology. Amaurotic family idiocy may be grouped in two types—first, the typical cases, with onset in infancy (Tay-Sachs), and the atypical cases, with an onset in childhood (Spielmeyer, Vogt). In this latter group, which is termed juvenile amaurotic idiocy, the characteristic macular changes do not occur.

Case I. B. S., a female child, born in America of Russian Jewish parents, when first seen at the Neurological Clinic of the

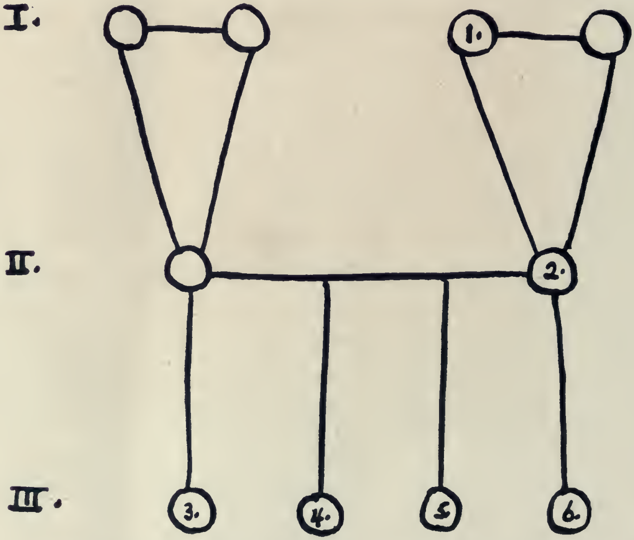

Fig. I.—Pedigree of Family—Case I. I. (1) Maternal grandfather became blind at 30. II. (2) Mother has hyperthyroidism; father healthy; no consanguinity. III. Two girls (3) and (4), aet. 8 and 5½, healthy; a boy (5), aet. 3½, healthy; (6), patient, amaurotic family idiocy.

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* Read before the New England Pediatric Society, March 1, 1913.

Mt. Sinai Hospital, was twenty-three months of age. The father and mother are not related. The father is healthy, non-alcoholic and non-syphilitic. The maternal grandfather became blind at thirty, before the birth of the mother. The cause of the blindness is unknown. The mother is a very nervous woman and suffers from symptoms very suggestive of hyperthyroidism (vertigo, tremor and tachycardia). There have been no miscarriages and none of the children have died. The patient is the youngest of four living children, all of whom are healthy and all, including the patient, have been breast-fed. (See Pedigree of Family, Case I., Fig. I.) The patient was born at full term, head presentation, easy and non-instrumental labor. There have been no convulsions. The child was nursed by the mother until its seventeenth month. Since then it has been bottle-fed. Up to six months of age the development was normal. The child could

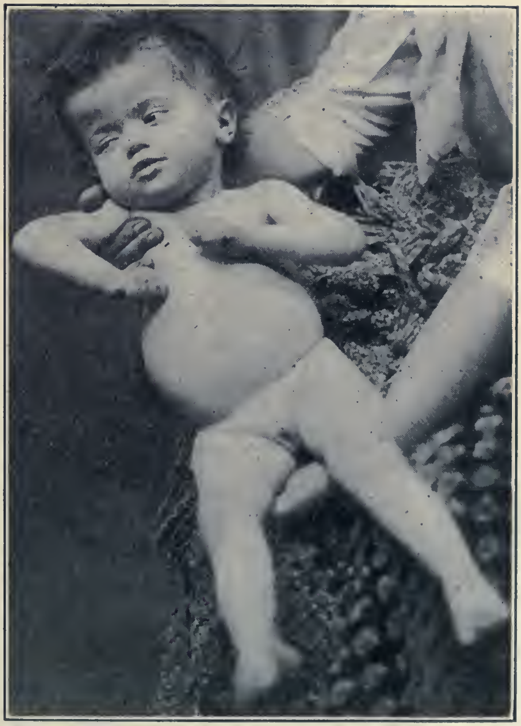

FIG. II.—Case B. S.—Amaurotic Family Idiocy, showing spasticity of limbs and hydrocephalus.

both hear and see, could stand with support and sit alone in a high-chair. At this time it was noticed that the child became dull and weak, and unable to hold objects in the hands. It gradually became unable to either stand with support or to sit up alone. Difficulty in swallowing appeared, with choking spells. The parents noticed that the child rolled its eyes from side to side and started easily at slight noises.

Physical Examination.—Pale, but well nourished. The child is unable to sit up alone and the head, unless supported, falls forward on the chest. It does not grasp objects when they are placed in the hands and fails to respond to the Binet-Simon tests for mental age of from one to two years. Auditory hyperacusis was marked, the child starting quickly and violently at slight sounds. Sometimes even a slight movement of the examining table will cause the entire body of the child to stiffen and tremble, like an experimental frog poisoned with strychnin. The anterior fontanel is open, but not tense or bulging. The posterior fontanel is closed. Pupils equal, 4 m.m., rigid to light. No nystagmus. The eyeballs do not follow a light and the child appears to be almost completely blind. No wink reflex on quickly approaching finger to the cornea. Cries feebly. Knee-jerks normal. No Babinski. Legs and arms moderately spastic. Head symmetrical, circumference, 45 cm. Sucking reflex normal.

Ophthalmoscope Examination.—Double optic atrophy. Retinal vessels normal. Cherry-red spot in the macular region.

June 24, 1912. In the last few weeks, bulbar symptoms have developed, such as choking attacks and difficulty of swallowing.

July 13, 1912. The child continues very sensitive to noises and is growing weaker and more dull.

October 4, 1912. For some time the child has been on thyroid extract, but without any improvement. Totally blind. Is weaker and thinner. Recently marked twitching of the facial muscles. Bulbar symptoms continue with attacks of apnea. The child cries feebly and will suddenly laugh without apparent reason. Slight internal squint of left eye. Pupils equal, 5 m.m., rigid to light. Moderate lateral and rotary nystagmus. Fundus as before. Circumference of head, 49.5 cm. Anterior and posterior fontanels open and tense. Sagittal suture likewise open. Less hyperacusis. Loss in weight. Dull and falling asleep frequently. Knee-jerks exaggerated. Moderate spasticity of arms and legs. Feet held in hyperextension. No Kernig or Babinski. Plantar stimulation causes a fine tremor and jerking of the legs. No rachitic rosary. Spleen not enlarged. (See Figs. II. and III.)

October 19, 1912. Totally blind. Spasticity and hyperextension of limbs more marked. Very slight hyperacusis. Attacks of hiccough, associated with convulsive tremor of the entire body.

November 9, 1912. Almost constant lateral nystagmus. Tenseness and slight bulging of anterior and posterior fontanel. Circumference of head, 50.2 cm. Plantar stimulation causes rhythmic tremor of the entire leg. No Babinski. Double optic atrophy with a cherry-red spot in the macula.

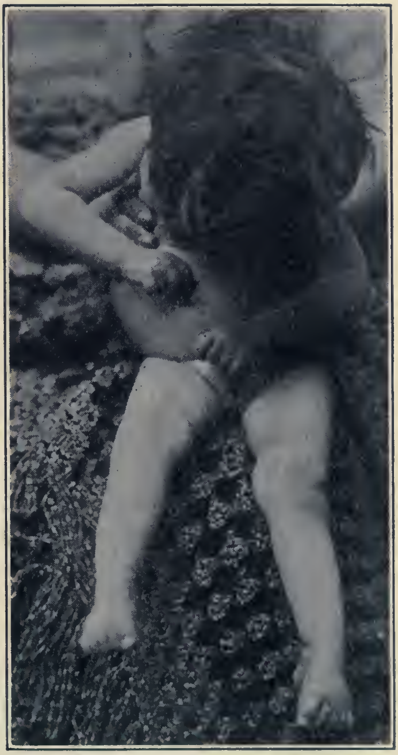

FIG. III.—Case B. S. Amaurotic family idiocy, showing flaccidity of head and spasticity of upper and lower extremities.

December 7, 1912. Progressive loss in weight and trophic disturbances over both buttocks. Feeble cry. Marked spasticity of the limbs. Slight hyperacusis. Totally blind. Circumference of head, 51 cm. Spontaneous clonus of both legs. Pupils dilated and rigid to light. Beginning bulging of fontanels.

December 21, 1912. Constant nystagmus of the eyes and to and fro movements of the tongue combined with sucking movements of the mouth. Circumference of head, 51.5 cm. Thirty c.c. of clear fluid under great pressure were withdrawn by lumbar puncture. This fluid contained only a trace of proteid and was free from a reducing body.

January 20, 1913. Thinner and paler. Marked spasticity of limbs. Fontanels bulging and tense. Circumference of head, 51.5 cm. The right pupil is larger than the left and both are rigid to light. Drooling of saliva and difficulty of swallowing. The ophthalmoscopic examination showed a typical cherry-red spot about the diameter of two optic discs to the temporal side of the fundus. A light greenish halo surrounds the cherry-red spot. The optic disc shows a shallow but very extensive cupping and a distinct atrophy. Vessels small and moderately tortuous. Complete blindness.

February 20, 1913. The child has whooping-cough and is gradually becoming weaker. Drooling of saliva is constant and there is an increasing difficulty in swallowing. When asleep, the mother has noticed a constant tremor of the entire body. The pupils are dilated, 4 m.m. in diameter, and are rigid to light. There is no winking reflex as the finger is rapidly approached to the cornea or when the retina is suddenly illuminated by a strong electric light. The feet are cyanotic and the entire body is spastic. Plantar stimulation of the soles of the feet causes the same rhythmic tremor of the legs as before noted. Alternate attacks of flushing and pallor are also present.

In this case the complication of the disorder with hydrocephalus is rather unusual, but it was noted as present in two observations (Sachs and Strauss, Huysmann). The peculiar tremor of the legs on plantar stimulation was also found in a case recently reported by Sachs and Strauss. The explosive laughter was probably caused, as in multiple sclerosis, by the mental deterioration, while the bulbar symptoms can be explained on the basis of widespread cellular changes involving the medulla.

Case II. J. S., a male child, was first seen at the Neurological Clinic of the Mt. Sinai Hospital on November 2, 1912. The child was then four months old. The parents are Russian Jews and are not related. Both the father and the mother are healthy, although the latter is inclined to be "hysterical." There have been four children, the two eldest, who are perfectly healthy, being born in Russia, while the two youngest were born in America. The third child was poorly nourished and poorly developed and showed signs of rachitis and cretinism. The mother states that this child resembled the patient with amaurotic family idiocy; the head became large, the body wasted away and it finally died of acute bronchitis. It was not noticed if the child was blind. All the children were nursed by the mother. The fourth child (the patient) was born at full term. (See Pedigree of Family, Case II., Fig. IV.) The birth was normal. Shortly after birth it was noticed that the child did not notice objects, and some time later, without any history of convulsive attacks, there developed a lateral nystagmus and a double internal strabismus.

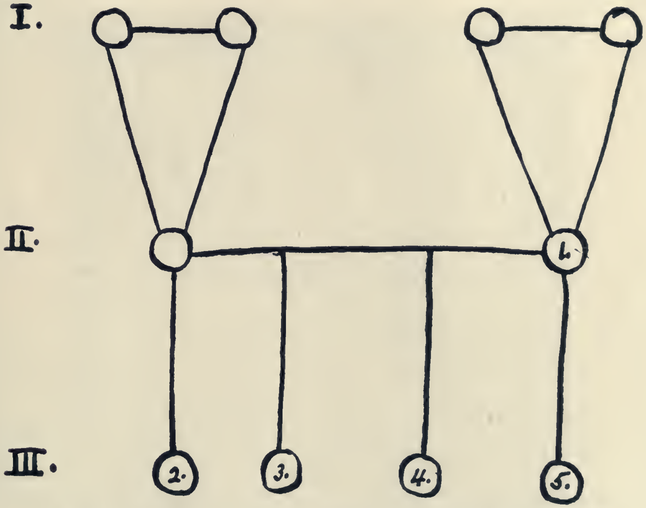

FIG. IV.—Pedigree of Family—Case II. I. Grandparents healthy. II. (1) Mother "hysterical"; father healthy. No consanguinity. Two girls (2) and (3), aet. 13 and 7, born in Russia, healthy. (4) Boy died with some wasting disease, enlarged head, rachitis, some signs of cretinism. Not blind. (5) Patient, amaurotic family idiocy. (4)-(5) *Born in America.*

Physical Examination.—Legs and head flaccid. No signs of hydrocephalus. Fontanels open, but not tense or bulging. Circumference of head, 42.5 c.m. No hyperacusis. Knee-jerks normal. Pupils equal and react to light. Constant lateral nystagmus and double internal strabismus. Weight, 17½ pounds. Well nourished. No deafness. Double Babinski (? insufficient myelinization of pyramidal tracts). Liver not enlarged. No signs of rachitis or cretinism. No tremor of lower limbs or plantar stimulation. Sucking reflex normal.

Ophthalmoscopic Examination.—Partially blind. Atrophy of optic disc with pallor of the choroid and a dark spot in the macula.

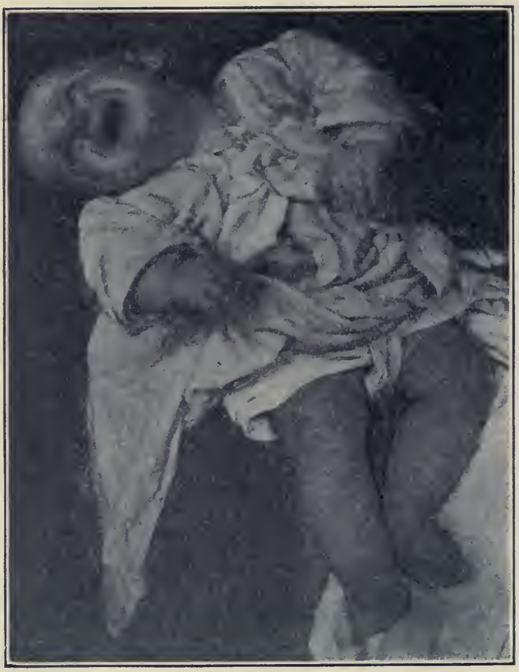

FIG. V.—Case J. S.—Amaurotic Family Idiocy, showing well nourished condition and flaccidity of neck muscles.

January 20, 1913. Occasional hyperacusis. Circumference of head, 45 cm. Constant nystagmus. Fontanels not bulging. No spasticity of the limbs. Knee-jerks active and normal. Inability to fully hold up the head. No difficulty in swallowing.

Completely blind. The ophthalmoscope examination showed a very deep cupping of the nerve head with atrophy, resembling the optic nerve atrophy seen in glaucoma. There was a grayish purplish area in the macula, evidently the remains of a former cherry-red spot.

February 20, 1913. Constant horizontal nystagmus with weakness of the right external rectus muscle. The hands are held in a position of hyperextension. Winking reflex practically absent. The pupils are unequal, the right somewhat larger than the left. The right pupil reacts promptly to light, the left is sluggish. The knee-jerks are lively and are more easily obtained on the left than the right. Circumference of head, 45 cm. No ankle clonus. Double Babinski reflex. (See Fig. V.)

The peculiar flaccidity of the limbs, the so-called "corpse-phenomenon" (Leichen phänomen), which occurs in myatonia congenita and to which Kowarski called attention in his cases of amaurotic idiocy, was not found in either of my observations.

The peculiar and prominent characteristics of amaurotic family idiocy are its hereditary tendencies and the almost exclusive appearance of the disease in either Russian or Polish Jews. Although the disease is preëminently a familial disorder, yet it has been strangely neglected in the modern investigations on heredity. The fact that in some families only one case appears, does not militate against the familial nature of the disease, because, as previously pointed out, the same tendency for an isolated case to appear in a family is found in other affections of the nervous system, such as Friederich's ataxia, some forms of muscular dystrophy and in the peculiar disorder resembling multiple sclerosis which I described in Russian Jewish children.

A prominent characteristic of the disease is probably the absence of a special type of resistance, referable particularly to the nerve cells, or, rather, to some special constituent of the nerve cells. The disease, however, does not seem to follow the laws of heredity found true for idiots or mental defectives. This absent trait in amaurotic family idiocy is a weakness of the nervous system due to hereditary predisposition, because the parts of the nervous system affected are not strong enough to withstand a prolonged normal function. In the nerve cell itself this absence of resistance seems to particularly fall upon the Nissl bodies, as these are far more affected than the neuro fibrils. A proof of the effect of the strain upon the Nissl bodies is shown by the fact that in prolonged experimental fatigue these bodies are the most affected. The individual tracts and cells are not strong enough to meet the demands of normal function and therefore rapidly deteriorate (Edinger's Aufbrauchkrankheiten).

These cell changes, however, are not peculiar to amaurotic family idiocy, as they have also been found in hereditary ataxia and in some cases of hereditary cerebellar atrophy. Their appearance in these hereditary diseases, however, furnishes some proof that the disorders in which identical nerve cell changes appear is probably due to the same mechanism, namely, an inherent lack of capacity of the central nervous system to withstand prolonged functional activity.

The disease is not due to arrested development, because the myelinization in the brains of cases of amaurotic family idiocy corresponds to normal brains. In fact, the frontal cortex and pyramidal tracts, which are myelinated late, are as badly affected as the visual cortex, which is myelinated early, probably in the ninth fetal month. In many idiots we find a standstill of brain development at some point of the embryologic life, but this does not apply to amaurotic family idiocy, if one takes into consideration that in these cases the myelinization is the same as in normal children. Unlike idiocy, also, the disease is not associated with gross macroscopic changes in the brain or in the appearance of the convolutional patterns, there is no deficiency in the lamination or number of the cortical cells, while the brain weights in amaurotic family idiocy are practically the same as in normal children who die at the same age. Furthermore, both my cases up to the period of the onset of the disease showed the characteristics of mental development which, according to Sikorsky, are supposed to be normal for a child between the ages of four and ten months. The disease, therefore, is not really an idiocy, but a form of dementia, and under these conditions it would be best to designate the disorder as amaurotic family dementia. That the disease is not transmitted by the mother's milk is shown by the fact that it may appear in families where the child is not nursed by its own mother or is bottle-fed. Furthermore, neither vascular, toxic nor infectious processes seem to play any part in its production.

The disease is primarily a disorder of the cells of the entire central nervous system and is characterized by swelling of the nerve cell, a peculiar balloon-shaped swelling of the dendrites resembling a cystic degeneration, marked chromatolysis and a rather marked persistence of the neuro fibrils. The optic tracts are degenerated, likewise the pyramidal,. cortico-thalamic tracts, visual cortex and frontal and temporal lobes. Scarcely a cell group escapes the morbid process. The blood vessels are normal. There is evidence that the retinal changes, which appear to be identical with those of the central nervous system (loss of Nissl bodies) are not present at birth. It is the change in the protoplasm of the ganglion cells of the retina which causes the cherry-red spot, the intensity of which will naturally vary with the extent of the degenerative process in the retinal neurones. The wide extent of this pathologic process and the peculiar selective action upon the constituents of the nerve cell, points to a lack of resistance in certain elements of the nervous system which tends to degeneration when called into functional activity. This degeneration is progressive and fatal, as it is extremely doubtful if regeneration can occur in the central nervous system. The absence of cholin in the cerebrospinal fluid of four of Mott's cases is rather surprising, in view of the active and widespread degenerative process. Therefore, the child who is predisposed to the disease, or in whom there exists an absence of those ingredients or tendencies which are present in normal children, shortly after birth becomes unable to withstand functional activity and falls a victim. In other words, it cannot perform these nervous functions for more than the first few months of life. In my second case the disintegration of the nervous system occurred at a very early date, probably during the first few weeks of life; in fact, an earlier date than I have been able to find in any of the reported cases.

Why, then, is the disease practically found only in Jewish children, and why are the non-Jewish cases less typical and show a tuberculosis of the corpora quadrigemina or of a tumor of the interpeduncular space rather than the typical findings of the disease? (Clairborne, Williams.) In most cases neuropathic tendencies or actual nervous diseases are found in the parents. This nervousness of the Jew is the result more of his environment than of any ethnic peculiarities which he may posssess. Even if the parents are apparently healthy they have probably inherited a nervous disposition from their persecuted and maltreated ancestors. This explains why cases appear in America of Russian Jewish parents, where the Jew is free from persecution, as well as in Russia, where they are constantly exposed to mental and physical strain. A child born with this nervous ancestry is just the child to lack in its nervous system those elements which function would protect from degeneration. The Jew is also probably for the same reason strongly predisposed to other nervous disturbances, such as diabetes, gangrene of the extremities, intermittent claudication, the dysbasia lordica of Oppenheim, and, finally, those cases described by me in Jewish children resembling multiple sclerosis. Studies in comparative race psychopathology have shown a high percentage of psychoneuroses and functional psychoses in the Jew, in which the endogenous or psychogenetic factors are the predominating causes. On the contrary, the small number of Jews who suffer from the organic psychoses is in striking contradistinction to the prevalence of amaurotic family idiocy among Jewish children. As the condition is expressed by Mott: "The disease is due to an inborn lack of specific total energy of the nerve cells, due to a racial inherited failure of the germinal determinants of the nervous system." Therefore the disease is not due to environment, because it occurs in America as well as in Russia; it is not caused by food, because the disease may appear in artificially-fed children as well as those who are breast-fed; neither is it due to thyroidal involvement, because the thyroid gland is not affected in this disease, and, furthermore, in cretinism the brain is of the type of an idiot's brain. Cases allied to amaurotic family idiocy have also been reported in Russian Jewish children (Gordon), but without the characteristic findings in the macula. In my second case it is interesting to note that the disease developed only in those children who were born in America, while the earlier children born in Russia were healthy—an instance of the cumulative force of environmental strain. Kowarski has recently reported 6 cases from in or near Wilna, Russia, while 21 cases in all have been reported from Russia. These, as well as those described in America, occur among those classes of Russian Jews which have been exposed to mental or physical strain.

Consanguinity appears to play a minor rôle, as it is mentioned in only 4 out of the 22 cases from the literature, where it was designated as present or absent. Kowarski, however, found it in 50 per cent. of his cases.

BIBLIOGRAPHY.

Clairborne. "Infantile Amaurotic Family Idiocy," ARCHIVES OF PEDIATRICS, 1900.

H. B. Carlyll and F. W. Mott. "Seven Cases of Amaurotic Family Idiocy," Proc. Royal Society of Medicine, 1911.

I. H. Coriat. "A Peculiar Form of Family Nervous Disease Resembling Multiple Sclerosis, Occurring in Children," Boston Medical and Surgical Journal, Vol. CLX., April, 1909.

L. Edinger. "Die Aufbrauchkrankheiten des Nervensystems," 1904.

M. Fishberg. "The Jews," 1911.

A. Gordon. "Cases Allied to Amaurotic Family Idiocy," New York Medical Journal, February 16, 1907.

W. I. Hancock and George Coats. "Pathological Examination of the Freshly-Fixed Eyes from a Case of Amaurotic Family Idiocy—Brain," 1911.

H. Higier. "Zur Classification der Idiotie und zur Pathologie ihrer Selteneren Formen," Deut. Zeit. f. Nervenheilkunde, Bd. XXXIX., 1910.

H. Kowarski. "Sechs Falle von Idiota Amaurotica," Jahrbuch f. Kinderheilk., July, 1912.

H. Oppenheim. "Ueber eine eigenartige Krampf Krankheit des Kindlichen und jugenlichen Alters" (Dysbasia lordica progressiva), Neurol. Centralbl., October 1, 1911.

Poynton, Parsons and Holmes. "A Contribution to the Study of Amaurotic Family Idiocy—Brain," 1906.

E. Rüdin. "Einige Wege und Ziele der Familien Forschung mit Rücksicht auf die Psychiatrie," Zeit. f. f. Ges. Neurol u. Psychiatrie, Bd. VI., H. 5, 1911.

A. Sikorsky. "Die seelische Entwicklung des Kindes," 1908.

Sachs and Strauss. "The Cell Changes in Amaurotic Family Idiocy," Journal of Experimental Medicine, September, 1910.

K. Schaffer. "Ueber die Anatomie und Klinik der Tay-Sachschen Amaurotisch Familiaren Idiotie," Zeit. des Jugend. Schwachsinns, Bd. III., H. 1 and 2, 1909.

H. Vogt. "Ueber Familiare Amaurotische Idiotie und verwandte Krankheitsbilder," Monat f. Psychiatrie u. Neurol., Bd. XVIII., 1905.

E. C. Williams. "Simulation of Some of the Symptoms of Primary Amaurotic Idiocy by a Tumor of the Interpeduncular Space," British Journal of Children's Diseases," October, 1907.

SIGNIFICANCE OF ORTHOSTATIC ALBUMINURIA.—M. H. Bass and H. Wessler (*Medical Review of Reviews,* 1913, Vol. XIX., p. 159) say that orthostatic albuminuria is a phenomenon of not at all infrequent occurrence. It is seen occasionally in children who otherwise appear to be absolutely normal; still in a large number of cases it appears to be only a concomitant symptom of a constitutional lack of development, the evidences of which can be found universally distributed throughout the body. The albuminuria is not even an essential symptom of this condition, as it may disappear from time to time, without any improvement in the subjective symptoms, which are of the type usually described as functional or neurasthenic. Conversely, the subjective complaints cannot be made to depend upon the presence of the albumin in the urine, for on appropriate treatment these symptoms may disappear, while the albumin persists. The treatment indicated, therefore, is a general one, not a dietetic or postural one aimed at the albuminuria *per se,* but one to restore the entire nutritional condition of the child to a normal level, when it will often be found that the albumin will spontaneously disappear.

THE NEUROSES OF CHILDHOOD.*

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It is not my purpose to give an encyclopedic account of the neuroses of childhood, nor to consider medical therapeutics, but to discuss three questions. First, is the occurrence of a neurosis an accidental thing which may affect any child, or is there a distinct type, separate from and unlike other children and alone susceptible to the neuroses and psychoses? Second, assuming such a type of child exists, can any accurate prophecy be made as to its future, mental and physical, and how much weight in determining this question should be given to each of the neuroses and psychoses? Third, assuming that the nervous child is predestined to an adult life of nervous or mental illness what, if anything, can be done to prevent its fulfilling its destiny? Though your president only asked me to speak on the neuroses, saying nothing about the psychoses, I shall include the latter, because the two are very closely related; indeed, are frequently merely different manifestations of one thing.

As to the first question, I think that everyone is agreed that there is a particular type of nervous child, who, apart from any particular neurosis he may be affected with at any given time, is essentially unlike his more fortunate brother or sister to whom nerves are unknown. The fundamental qualities that differentiate him from normal children are a pathologic irritability shown by an excessive response to stimuli of all kinds, weakness in withstanding stress, and a lack of ability to develop power of inhibition. Together with this there is often, but not always, a lack of purely physical strength or, rather, a lack of will to make effort. Nutrition often is surprisingly good, such children being sometimes fat and plethoric.

A word as to the cause of "the nervous child." Heredity plays a much larger part than environment. Almost always, if you learn the family history, you will discover a biologically bad strain. There is not time here to discuss the question of the relative importance of heredity and environment and I can only make the dogmatic statement that though environment is powerful both for good and evil, heredity is still more powerful. The gross organic diseases of childhood play no part in producing "the nervous child." Trauma to the skull, meningitis and the acute infectious fevers when they leave permanent effects show them in very different ways. The nervous child is such by temperament, disposition and nature, and these are elemental things, not dependent upon accidents happening to the child and having an external origin. If, for example, the accident of fever were the real cause of convulsions then all children with fever would have convulsions. Really the number is very small, and in those in whom convulsions do occur it is not because the fever is acting on a normal but as yet unstable brain, but because the brain itself is abnormal. If mere refractive error were the true cause of facial habit spasm every child who needs glasses would so suffer, but they do not. There is no need to multiply illustrations to prove this point.

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* Read at the meeting of the Philadelphia Pediatric Society, March 11, 1913.

The condition does not depend in any degree on mere physical delicacy of health, or malnutrition. All of us have known children who were, to look at, almost starvelings, who yet had as children, and continued to have in adult life, good self-control and whose nervous systems were no more irritable than normal. On the other hand, apparent good nutrition does not prevent it. We all know children who look physically well who yet have no power of nervous resistance and who become hysterics, or worse, of the deepest dye. This simply means that whatever the physical cause of "nervousness" may be, and we assume a physical cause for all disease, it is independent of the nutritional processes. Also I do not mean to say that long continued and painful illness may not break down a child's ability for nervous control and make it fretful, peevish, selfish and even nervous, but only that in such cases these qualities are only acquired characteristics, not an inherent part of the child's nature, and that they can be overcome by proper environment. For example, some years ago there was under my care at the Philadelphia Home for Incurables a girl seven years old suffering from Pott's disease and coxalgia, who had been living all her life in wretched surroundings and whose mother had given her morphia daily for more than a year to quiet her pains. When the child came to us she was a confirmed morphinist. She had no self-control and showed all the signs of a nervous child of the worst type. The struggle to free her from the morphia habit was a long war, but the habit was broken, the tuberculous bone processes ceased and today she is nervously and mentally an entirely normal young woman, though she is a chair-ridden cripple. The explanation is that she was not inherently a neurotic. She is a brilliant example of what a good environment can do.

One interesting question as to these children is still unsettled. Are the neurotic sharply cut off from the psychotic—pardon the barbarous word, but I know no better—or do both belong in the same group? So far as the inheritance that the sufferers pass on to posterity is concerned, neuroses and psychoses are interchangeable, but when it comes to the effect of an infantile neurosis or psychosis on the future life of the individual himself, certainly the latter is much more dangerous and is usually shown by insanity, while the former rarely is transmuted into a purely mental disorder.

The second question, the influence of neuroses and psychoses on the future life history of the patient, is one of the most difficult and obscure in medicine. So many factors come into play in determining a child's fate, so many unknown things happen within the child at puberty and during adolescence, that prophecy is always dangerous and often wholly erroneous. If we knew all about a child's parents and grandparents, and if we really knew his own medical and personal history we could often foretell with accuracy, but notwithstanding our ignorance of these matters I think sometimes we can very early in life foretell that adult life will inevitably be abnormal, though what the type of abnormality is to be may be impossible to foresee. Thus given an infant who persistently has outbursts of causeless, almost maniacal anger, who gets convulsions from trifling illness, who does not show any affection in later babyhood or early childhood, who cannot be taught self-control, that child will not withstand the crisis of puberty and will never be a normal man. His best fate is to grow up into a dull, stupid, apathetic person, who may be able to do routine work requiring little mental power; his worst fate is the insane asylum or the jail. There is another type, and this fortunately is much commoner, in which signs of abnormality begin to appear only at or soon after puberty. The history is usually the following: An uneventful childhood. Then at about twelve or fourteen years the boy begins to lose zest for life. He lags at school and loses ambition. He begins to complain of vague aches and pains. He cannot study because of eye-strain; he has occipital ache. Appetite is poor; instead of being willing to stand the pain of colic for the joy of green apples he is finicky about his food. He no longer cares for play or for companionship. He becomes moody and ill-tempered. His whole character changes. If he be the spoiled darling of a doting mother he soon becomes a household tyrant and his end is bad. If his parents and his doctor be wise he may be saved. There is a type of pubertal insanity, entirely incurable, which presents at its beginning much the same picture, but many boys suffer a short period of unbalance which skillful care and inherent strength of constitution cure.

Some children, and it is of these I speak tonight, show profound evidences of nervous instability in childhood and even in babyhood. The more important of the neuroses and psychoses they present are as follows: First, motor disturbances, convulsions, stammering, habit spasm, generalized tic, St. Vitus' dance, epilepsy. Second, purely mental disorders, insanity (mania), night terrors, day terrors, hysteria, obsessions. Third, vaso-motor disorders, morbid blushing, tachycardia. Fourth, disorders of special viscera, nervous vomiting and anorexia, and enuresis, and, finally, for I know not where to place it, headache. Now this is a very miscellaneous list, a very hodge-podge of diseases, and at first sight one would say that there can be no relation between many of them, but really they all have one thing in common—they all mean instability of the nervous system. The exciting causes, when, indeed, we know them, are very various, but the underlying cause is in the child himself, is endogenous and not exogenous. Every child, no matter how great the stress, cannot be made to suffer from any of the above disorders but only the nervous weakling. This is true even of St. Vitus' dance, in which we seem to be almost getting proof that some one or several specific causes are necessary as excitants. Even in St. Vitus' dance soil is needed for the seed to flourish in.

The neuroses and psychoses vary greatly in their importance as portents. The child who suffers a series of them almost always is a life-long invalid, but many children suffer from one or another, regain equilibrium and retain it throughout life, never showing any sign later of having had any nervous disorder. Others break permanently very early and never regain the normal. Still others seemingly regain stability, but break again either at puberty or during adolescence or even after maturity is attained. Let us see if we can draw any conclusion as to the different values of various disorders in foretelling the future. No statistics are obtainable on this matter, and I therefore can only give my own impressions, founded on my own experience. No man can study a large enough number of people to be sure that his opinion in a matter of this kind may not be erroneous, and I reserve the right, therefore, to change my mind as to the relative importance of some of these disorders. One object of this paper is to interest you so that you will keep records of neurotic children in order that sometime we may have data enough to draw positive conclusions from. Some of the neuroses are of trifling severity. Thus most children who suffer from enuresis, stammering, habit facial spasm, night horrors and the much rarer day horrors, save when the latter is really a manifestation of epilepsy, recover entirely and grow up into average men and women. Of all these the seriously affected stammerer suffers most, because he frequently never recovers and his speech defect cuts him off from so many things in life that he may become morbidly introspective, not as a direct, but as an indirect, result of his stammering. Convulsions in and by themselves may be serious or not. The great danger is that convulsions, apparently accidental in origin, may develop into epilepsy, but the mere occurrence of a convulsion, or even a series, if the child recover without any sign of organic brain disease, is not of very great import as to future health. The convulsive movements associated with rickets seem to me to be particularly amenable to treatment and particularly harmless in late results. Generalized tic and tetany are so rare that we know nothing of their significance.

The more important mental disturbances, insanity and hysteria, are of dire significance. Both are fortunately very rare. Mania is practically the only insanity occurring in childhood. Usually, if it does not kill, it ends in imbecility. The few who escape become, as a rule, permanently insane in early life. The very few children with genuine hysteria whom I have seen have easily been cured of their attacks, but have continued to be hysterics. I think that passing obsessions are more frequent in children than we are aware of and certainly a large majority of the sufferers show no sign of mental disease in later life.

Nervous vomiting and anorexia I have had so little experience with as to be unable to draw any conclusion about, and, on the other hand, headache in children is so frequent and is caused by so many things that I am often in doubt, indeed at first always in doubt, in any given child as to whether it really is nervous in origin. The neurasthenic child, like the adult, always complains of queer occipital sensations, but there are always other neurasthenic symptoms associated with them.

As to prevention. There are two different and, to a certain degree, contradictory kinds of effort being made rapidly to improve the race and, among other things, to eradicate or cure "the nervous child." The disciples of one school preach as the great means of race improvement restriction of marriage to the fit, and believe that by fiat of law it is possible so to restrict the production of children that only those biologically fit would be born. The other school believes in the possibility of making many unfit children healthy men and women, and believes strongly in the power of education and, in less degree, of medical treatment to overcome all innate evil, hereditary or congenital traits. The aim of both schools is to improve the race. Now I do not wish to pose as a cynic nor to appear as a Jeremiah crying in the wilderness, but I must say in all frankness that my study of the defective classes makes me pessimistic about race improvement by putting laws on the statute books or by trying to cure those in whom the congenital predisposition is very strong. The whole question is not so far from the subject of my paper as you might at first sight think, because, after all, "the nervous child" often becomes the degenerate adult and very often is the starting point of a family taint. The manifestly ill—the imbecile, the insane, the epileptic, the criminal—do not procreate as much as do the abnormal people whose abnormality is not marked enough for the wildest enthusiasts to attempt to restrain their lives. These "borderland people" constantly recruit, by their offspring, the degenerate army.

Notwithstanding my apparently pessimistic view, and its pessimism is more apparent than real, I believe that something can be done to keep many weaklings from fulfilling their destiny. The greatest power for good will come from the training of children. The most important thing in the training of "the nervous child" is the teaching of emotional control, and that cannot be done by making life easy. The whole spirit of today is against teaching children self-control. The real fundamentals of education are self-control (inhibition), obedience, duty, and a love for work. The popular tendency of to-day is to teach that while a parent owes duties to the child, the child owes no duty to the parent. Obedience has gone out of fashion and one book, the product of a professor in a university of recent origin, openly preaches that in a democracy no child should be taught obedience, because where there is obedience there can be no freedom. So far from a love of work being inculcated many children are taught labor is an evil, and some learn to look with hate and envy on everyone who reaps rewards from toil.

This belief in the evil of work, with its related doctrine that children should not be subjected to any mental stress, has led to the promulgation of a pedagogic system, the fundamental principle of which is that education should be made easy, that children should be taught surreptitiously under the guise of play, that duty should not be taught as duty, no matter what the pain, but should be made pleasant and agreeable. One practical result of this is that the strong, healthy, normal child does not get what, by right, he should have, but is pulled down to the level of his weakling brother. School studies must be arranged not to suit the strong boy, but the weak. In the same way on the physical side of education everything is arranged to suit the ability of the weakling. For example, in one at least of the large cities of the country, on stormy days there is no afternoon session in the public schools lest the boys and girls get rained upon and sit in school with wet feet. There is pictured to us all the horrible diseases that may follow the juvenile wetting. Each little boy must have his own little cup lest he drink some other little boy's personal microbes. His food must be weighed and measured and analyzed lest it be adulterated and his dear little stomach have too strong a burden put upon it. No longer may the healthy young barbarian gorge himself on fat-soaked doughnuts, nor sweet but dust-bespattered pies; no longer may he, with boyish altruism, share his core with a beloved chum; no longer dare he, deep in the meditation of adding vulgar fractions, suck a borrowed pencil; no longer may he use spittle to wash from his slate the hard-thought sentences of his attempts at composition; no longer dare he, in vulgar boyish pride, show his envious comrades a festering finger wrapped in a dirty rag. All these joys are unhygienic and hence taboo, for hygiene is the god of today. Understand me. I am not making fun of true science. I am not forgetting the real horrors of disease; I am not condemning sensible efforts to keep children healthy, but I am condemning popular hygiene run mad. Were it practicable really to eliminate bacteria and other causes of disease it would be a great thing. To eliminate all strain from life might make life longer, but also, some think, scarcely worth the living. Today there are people doing all they can, out of misguided kindness, to make a race of weaklings—a race which will not be able to withstand the stress and strain of life and the inevitable contact with disease. It is difficult to prove it, but I am sure that within rational limits exposure to the causes of disease helps to render us immune, and I am also sure that the child too carefully guarded will, when he meets inevitable exposure to any stress, succumb. The child who has too much attention paid to its aches and pains may become a youthful hypochondriac. The child not taught in the nursery and the school to bear unwhimperingly this daily stress will break so soon as he gets into the world of life.

Another error in the child training of today is its effeminacy. The moral sense has become effeminized and emotionalized, our altruism has attained such gigantic proportions, our loving pity for the weak has become so great, that virility and strength are ceasing, in some quarters, to be regarded as virtues. Fortunately, effeminization and emotionalism carry their own cure within themselves. In the meantime the world will have time to regain balance and nature will continue to weed out the unfit and reward the fit. The doctrine that the weak should inherit the world will not have vogue very long.

SYPHILIS OF THE NEWBORN.—M. E. Jeanselme (*Jour. de Méd. de Paris,* March 8, 1913) relates a case of infection of the nipple of a healthy wet nurse by a syphilitic infant given her to nurse. The fissure infected was regarded by the attending physician as not suspicious until some time after its appearance, when the mother's own infant had already been infected. The author believes that every old-looking, wizened infant, even if not showing pemphigus at birth, should be considered suspicious and not given to a wet nurse until observation had shown it to be healthy. Physicians should be most careful in this matter of diagnosis, and of warning the wet nurse of her danger of contagion.

THE CHOREAS OF CHILDHOOD.

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This paper is a resumé of the more recent views and scientific advances that have been made in minor chorea. It is interesting that even at the present time many competent medical men and first rate text-books still regard chorea as a functional disease, although the present tendency is to ascribe a definite organic basis for it. In the more recent text-books ordinary chorea has been given the term "infectious chorea," the other classification consisting of hysterical chorea and the adult or Huntington's type.

The most interesting phase, of course, is the pathogenesis. There has always been a question as to the relation of rheumatism to chorea, and even at the present time divergent views are held. For example, M. S. Fraser, in *Practitioner,* 1912, analyzed 300 cases. In 53 per cent. there were definite evidences of rheumatism, either previous to or concurrent with the attacks of chorea. In 72 per cent. there was either a personal history or a strong family history of rheumatism. Again Fraser points out that there is a seasonal incidence and that the maximum of chorea occurs one month later than rheumatism. He quotes Batten, who states that of 115 cases 25 per cent. developed rheumatism within six years after chorea, although they did not have chorea at the time. Fraser, therefore, concludes that the majority of cases are closely associated with rheumatism and that all true cases of chorea are rheumatic in origin.

On the other hand, with the advancing view that chorea is not a functional disease, but that it results from definite organic changes in the nervous system, an effort is being made to establish a more definite causal basis. This is well put forth by Cramer in the *Handbuch der Nervenkrankheiten im Kindersalter,* Berlin, 1912. This author, in what is probably the best article written on the subject, summarizes practically all modern views. He states that in his experience most cases of chorea, if carefully examined, will be found to have some connection with an infectious disease, some authors giving as low as 32 per cent., while others give 90 per cent., the reason for the difference in percentage being that up to the present there has not been adequate differentiation made between real infectious chorea and the hysterical type. He states that in a careful examination it will be found that in most cases there is a slight rheumatic involvement of the joints or slight rheumatic pains, and if there is added on to this some additional cause chorea might develop, his theory being that in most of these cases there are depots of infectious material which for some reason become mobile and chorea follows. He does not, however, state that every child with rheumatism will have chorea, nor that every case of chorea necessarily has to have rheumatism. Whether or not a child will develop this disease depends upon some agent of an unknown nature of an endogenous moment. Again, the art of infection varies—as, for example, not every case of diphtheria is followed by paralysis nor every case of lues by nervous symptoms. Again he calls attention to the fact that most cases occur in the spring, when infectious diseases are most common. Many other infections are mentioned—as tonsillitis, scarlet fever, measles, syphilis, typhus, erysipelas, gonorrhea, etc.

For some time an attempt has been made to ascribe a bacteriologic basis. Cramer points out that it is an interesting fact that chorea occurs in those months in which persons are especially liable to so-called colds and that there have been epidemics of chorea. It is interesting in this connection that chorea does not occur in the tropics. The microörganisms have not always been alike. There have been described diplococci, staphylococci and the bacillus intercellularis of Weichselbaum. These have been found in the blood, in the brain tissue and in the cerebrospinal fluid. Donath (*Zeitschrift f. die gesammte Neurologie u. Psychiatrie,* Vol. IV.) believes that the staphylococcus pyogenes albus and aureus have a special relation to chorea, although he does not attribute to them the specific cause. In his opinion the streptococcus as well as the staphylococcus may be the cause of chorea in an individual who at the time of involvement is weak, anemic and of a nervous constitution and hence unable to resist a bacteriologic invasion. These findings, as can be readily understood, have been differently interpreted by different authors.

In an excellent paper from Obersteiner's laboratory, Orzechowski (*"Arbeiten aus dem neurol. Institut von Obersteiner," Leipzig, u. Wien.,* 1907, *bei Deuticke*) states that practically all cases of minor chorea with histologic examination show a septic inflammation and that in those cases in which this does not occur it is because the infection was so slight that the lesions were too small for detection. He points out that in practically all severe cases the same pathologic findings are found, and states that chorea could very easily be a septic disease and that the infection could occur in the skin or tonsils, and, further, that whenever death occurs it is always due to septic causes. If it is accepted that chorea is an infectious or septic process then the onset and the return of symptoms can be explained, for it is well known that the infection may be present in the tonsils and not become generally apparent until some extraneous cause brings on the symptoms. Further, the recurrence of chorea could also be explained on this basis.

Another interesting theory is by Sergent and Besset in the *Arch. f. Kinderhk.,* 1911, who described a case of chorea mollis in a child of eleven in whom after fifteen days there was pseudo-paralysis, loss of reflexes and incontinence of the sphincters. To them the whole disease and the appearance of the child suggested the picture of adrenalin asthenia. As a consequence, they gave on two occasions .1 dram of pulverized adrenalin extract, and almost immediately the symptoms began to disappear. As a result of this the authors believe that chorea mollis may occur from insufficient adrenalin secretion. They state that it is a well-known fact that one of the functions of the adrenalin secretion is to neutralize the toxin of muscular exertion, and inasmuch as in chorea mollis the muscular exertion is increased this drug is indicated.

Pathology.—When considering the various clinical symptoms found in chorea, such as paralysis, amyotrophy, trophic disturbances, hypotonia, irregular movements, disturbances of coördination and certain psychoses, it would not be improbable to expect different organic changes not only in the cortex, but also in the cerebellum. The different findings consist in disseminated areas of encephalitis of an infectious or toxic origin with an involvement of the pia, circumscribed inflammation of the vessels, fibers and tracts and staphylococcic meningitis, while Margulies (*Korsakoff's Journal.* Abstract in *Jahresbericht f. Neurologie,* 1910) believes that as a basis there is a chronic gliosis chiefly of the brain stem and cerebellum. While the different pathologic findings have been by no means uniform, in a number of cases there have been more limited lesions, such as by Anton (*Jahrb. f. Psych.*, 1895, Vol. XIV., S. 610), who found symmetrical disturbances in the third portion of the lenticular nucleus. Forster (*Jahrb. f. Kinderhk.*, Vol LXXI., No. 4) found, in some cases, disease of the cerebellum or of the superior cerebellar peduncles. This author, with Bonnhofer, believes that the cause of chorea minor is a toxic infectious disturbance of the cerebellum or of the superior cerebellar peduncles. With this view Cramer agrees.

If, therefore, it is assumed that chorea is the result of an infectious toxic process affecting either the cerebellum or its connections, chiefly that of the superior cerebellar peduncles, the clinical symptoms can be very readily explained. An analysis of the choreic twitchings show spontaneous movements and incoördination. In other words, there is disturbance of the motor and cerebellar apparatus. The movements are of large excursion, in which only one muscle or one muscle group may be in the spasm, while the antagonistic muscles are not at all in action. Again, it is also characteristic that one muscle or group of muscles may act one after another, while the next muscular group may be in an entirely different part of the body. In the milder cases the distal portions of the extremities are involved, while the more severe the case, the more the implication of the proximal musculature. Forster has made an excellent analysis of the choreic movements. His general conclusions are that in every choreic movement, whether spontaneous or coördinate, there is never the normal antagonism and synergism that there should be, that, for example, when a patient attempts to lift up the right leg he does this, but at the same time lifts up the other limbs. In other words, the innervation impulse for any group of muscles is irradiated to other muscles which have nothing at all to do with the particular movement desired and there result associated movements. Not only is there innervation of the other muscles, but in any movement the antagonists and the collateral or rotary synergists are, in the more severe cases, very little, or not at all, in action, and because of this there follows innervation of those muscles which are either undesired or not looked for, and therefore the irregular movements which are so common in chorea. If it is assumed that there is a lesion either of the cerebellum or its connecting tracts, then any impulses coming or going to the cerebellum will necessarily be diverted from their regular course and there result the incoördinate movements so common in this disease.

Hypotonia, which is an extremely common symptom in chorea, can also be explained by this pathogenesis because it is very common in cerebellar lesions.

So far as the symptomatology is concerned, there must be differentiation made between the associated and the spontaneous movements of chorea, the former being not so quick nor so variegated and are slower and remain longer—so long as the intention for the movement remains and ceases when the desire stops.

Symptoms.—Chorea is characterized by spontaneous movements, disturbance of coördination and involuntary movements. Hypotonia is one of the earliest symptoms. In an excellent paper in the *Revue Neurologique,* December 15, 1912, by Grenet and Loubet, the authors call attention to the organic symptoms found in this disease. These are best studied when the chorea is limited to one side. Their general conclusions are that there is nearly always hypotonia of the affected limb, say the arm, which shows itself by the lowering of the shoulder, and by the possibility of exaggerated flexion or extension of the forearm. The hypotonia is perfectly well seen, as a rule, in the supinator group, the pronators retaining their normal tone. Thus, if the arms are held vertically above the head, the sound limb (hand) takes up the usual position midway between supination and pronation, while the affected hand becomes pronated. Combined flexion of the thigh and trunk, so frequently seen on the affected side in organic hemiplegia when the patient, with his arms folded, endeavors to rise from the supine to the sitting position, is frequently to be observed in chorea. Again, syncinesis or associated movements—the affected side making the same movement as the sound side—is sometimes seen in chorea. Plantar extension, also, it is agreed, is by no means rare in this disease. The writers have found Babinski's sign present in 19 cases out of 74. Strumpell's sign—contraction of the tibialis anticus when the patient's attempt to flex the leg on the thigh is resisted by the examiner's hand placed on the anterior aspect of the thigh above the knee, the foot going into a position of equino varus—is also to be noted in chorea. On the other hand, the condition of the tendon reflexes is inconstant and variable. As for cerebellar symptoms, defects of synergy are common enough. Dysmetria—*i.e.,* over-action of the various groups, muscular groups, in such a movement, say, as that of grasping an object—has been found in chorea in a number of instances. Similarly there is sometimes an inability to execute a succession of rapid identical movements, such as rotation of the forearm from the elbow (adiadococinesis of Babinski). No doubt the presence of abrupt involuntary movements may mask these others during a test, and. apart from this, it appears that in all the signs above enumerated are of equal value. The presence of an extensor plantar response is, of course, highly significant. The presence of hypotonia also is worth noting, although in young children there is greater range of passive movement than in the adult. If, however, there is a definite difference betwen the two sides of the body, muscular hypotonia must be considered an important sign. It is less easy to assert that cerebellar disturbances characterize Sydenham's chorea. As a general rule, if the patient is able to make slow alternations of movement as well on either side, but fails on one or the other in rapid performance of the same, true adiadococinesis must be admitted to occur, and it is clearly a sign of organic defect. In an investigation of 74 cases MM. Grenet and Loubet found muscular hypotonia 51 times; adiadococinesis 43 times; syncinesis in about half the cases; dysmetria in 25; Oppenheim and Babinski's signs each 19 times; combined flexion of the thigh and trunk in 16 cases, and Strumpell's sign in 9. It may be said, therefore, that in Sydenham's chorea one or other indication of pyramidal or cerebellar defect is to be found in almost every case.

Among the unusual types of chorea mentioned is that of Bruns (*Handbuch der Nervenkrankheiten in Kindersalter,* Berlin, 1912), who mentions a bulbar paralytic type in which there is difficulty in eating, talking and swallowing and in which the twitching is confined to the muscles of the mouth.

Nothing else new has been added regarding symptomatology, although a variation of the patellar reflex has been described by W. Gordon, who found that when tapping the patellar tendon there is an extension of the leg, which, instead of subsiding, immediately continues and which is supposedly the result of a reinforced impulse.

So far as the mental symptoms of chorea are concerned, R. Miller, in *Lancet,* 1909, states that they are of great importance and it is not too much to say that they have not received the recognition that is due them. They are so constantly present and so much a part of the disease that in many ways chorea might well be looked upon as a mental rather than a motor disease. Yet the mental side has been so neglected that some authors have gone the length of describing a condition which they term "hemichorea." With the severe forms of choreic insanity, such as raving delirium, agitated melancholia, dementia or coma, we are not here specially concerned. What I wish to emphasize particularly are those slighter types of mental perversion which are seen in one type or another in all choreic children. These are mental depression, excitability, emotionalism, inattention, loss of memory or signs of diminished control, as shown by outbursts of passion, unnatural fear, uncontrollable laughing or crying. Often if the history of the onset of chorea be carefully traced, it is found that such symptoms as these are noted prior to the development of definite movements. As a rule, early in the disease the mental attitude is one of depression, while during convalescence it becomes one of exaltation. In their slightest forms, therefore, these symptoms of chorea would appear as those of mental instability as shown by excitability, fretfulness, inattention, attacks of passion and of crying, such symptoms as might be found in a neurotic, spoilt but non-rheumatic child.

As far as treatment is concerned, there has been nothing new, although emphasis has been placed upon the rest treatment. Some cases, however, have been reported, such as those by Camisa (*Jahrb. f. Neurol.,* 1911), Meyerhofer (*Wien. klin. Woch.,* 1911), Hahn (*Deut. med. Woch.,* 1911), and Pierre Marie, in whom, after intravenous and intramuscular injections of salvarsan, the symptoms promptly ceased.

Differential Diagnosis.—It is not at all infrequent to confuse infectious chorea with the hysterical type. In the latter, that is, the hysterical form, the movements are very much like those of chorea, but are of greater excursion, the larger portions of limbs are involved, the proximal more than the distal. If the case is carefully watched it will be seen that there are no associated movements as there are in chorea. Again, there is rarely disturbance in eating. Besides, the history is different. The hysterical type may be brought about by excitement, fright and the usual hysterical causes. There is an absence of the usual history of infections and the presence of possible heart disease.

Again, the twitchings can always be stopped, for a time at least, when attention is drawn elsewhere, whereas in chorea this cannot be done.

Tics.—It should not be difficult to diagnose between chorea and tics, for the latter are due to psychogenetic causes. Besides, the movements in tic always have a manifold purpose and are usually defensive in action, in which at first there is a purpose and which later on become more or less automatic. In a word, the important differential points in the diagnosis between choreic movements and those of tic and hysteria are that in the first there is always hypotonia and characteristic associated movements and a possible accompanying heart condition. It must be, of course, remembered that sometimes chorea is associated with tic.

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EXPERIMENTAL STUDIES OF THE POSSIBILITY OF COMMUNICATION OF INFANTILE PARALYSIS THROUGH LIFELESS MATERIALS AND THROUGH FLIES.—Arnold Josephson (*Münch. med. Woch.*, January 14, 1913) gives the results of his experiments with materials handled or used by children as to the possibility of transmitting the virus of infantile paralysis. The experiments were made at the Hospital for Children's Diseases in Stockholm. The author gave to two very sick children compresses which were used as handkerchiefs during an entire week. He also allowed a picture book to circulate among the sick children, and allowed one girl to make a piece of fancy work with papers. He also allowed flies to bite patients. He infected a monkey with extract from the pocket handkerchiefs and the monkey developed the same symptoms as the sick children. The filtrates from extracts made from the picture book and other papers was injected intraperitoneally and intraneurally into other apes. Control animals were injected. The animals injected suffered from paralyses similar to those seen in children. With flies the author obtained only negative results. These experiments show that the virus of infantile paralysis may remain virulent on lifeless materials and be communicated by them.

EPILEPSY IN CHILDHOOD.*

BY JAMES HENDRIE LLOYD, M.D.,
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I suppose in one sense epilepsy may be called a hackneyed subject, yet in a wider sense the sacred disease is a subject of perennial interest. I am confident that I shall not be expected to cover it all in twenty minutes, nor shall I try to give a systematic paper on it. A recent bibliography, compiled for the journal *Epilepsia,* and covering in part only the years 1910 and 1911, fills twenty-eight pages with titles. In such a wide field it will be my part, I fear, to reap only a modest harvest.

Allow me to say, right at the beginning, that this is an appropriate society before which to discuss epilepsy—for epilepsy in more senses than one is a disease of childhood. Statistics show that the large majority of cases begin in very early life. Gowers found that more than a quarter of all cases began under the age of ten years, and nearly one-half between the ages of ten and twenty. Spratling, in 1,302 cases of epilepsy, found that 163 cases began in the first year of life; in the first ten years, 38.5 per cent.; in the second decade, 43.5 per cent.; or, in other words, 82 per cent. of all his cases began before the age of twenty. These figures show very graphically that epilepsy is a disease of childhood and adolescence. In any other disease, if such figures were forthcoming, the affection would be assigned to the pediatrists. It is only because epilepsy continues into adult life that it is not generally included among the diseases of children.

This brings us at once to the consideration of a very important topic. I mean the distinction between epilepsy and infantile convulsions. By common consent these two affections are differentiated. Nevertheless, the distinction is not always easily made. In their clinical manifestations these two affections are identical; that is to say, the infantile convulsion is in its form epileptic. The convulsion in no wise differs from an epileptic fit. The distinction which we make between the two is based, first, on the cause; second, on the subsequent history. In infantile convulsions we postulate a cause that acts transiently, such as the poison of one of the infectious diseases—as scarlatina, measles or pneumonia—or gastrointestinal disorders, or teething, or even some obscure cause which we believe is transient; and in the subsequent history, when we find the convulsions are not repeated, we conclude that the affection is not true epilepsy.

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* Read before the Philadelphia Pediatric Society, March 11, 1913.

But this is really a very uncertain ground for a differentiation. Spratling, as I have said, found that 163 of his 1,302 cases of true epilepsy began in the first year of life, and nearly 300 of them began in the first three years. Who could have said, in any one of those cases, at the date of the first fit, whether it was merely a case of infantile convulsions or whether it would prove to be essential epilepsy? The scientific grounds are wanting.

So strongly impressed with these facts are some authors, notably Féré, and others whom he quotes, that they seem inclined to view all cases of infantile convulsions with suspicion, and to look in these cases for heredity and other evidences of a neuropathic taint. Féré believes that the neuropathic taint is the predisposing cause, and that the infection—as, for instance, scarlatina—is only an exciting one. However that may be, I do not doubt that all of us here have seen cases of true epilepsy beginning in one or other of the infectious diseases of childhood. I have under my care at the present moment a boy, seventeen years old, who has essential epilepsy. His first fit occurred when he was seven years old and followed an attack of measles. I should not wish, however, to be understood as taking extreme ground in this matter. I know that infantile convulsions are often transient and do not lead to epilepsy. I only wish to indicate some of the problems involved. I think, however, that in any case of a young child, in which successive fits occur at more or less prolonged intervals, anxiety is justified and treatment indicated.

Heredity has been invoked as a common cause of epilepsy, and statistics undoubtedly prove its influence. It does not follow, however, that every epileptic child has had an epileptic parent or that every epileptic parent will beget an epileptic child. Heredity does not explain this whole problem, and, besides, there are enormous difficulties in the way of tracing this subject. Let us reduce it, for example, to a mere mathematical demonstration. Every individual has two parents, four grandparents, eight great-grandparents, and so on, multiplying every generation by two, until it will be found that he has more than a million ancestors in the twenty-first generation; and in the fortieth generation the number of millions of ancestors is quite inconceivable. Thus, if it had not been for intermarriages among our ancestors, every one of us, in the comparatively short space of one thousand years, would have to claim more ancestors than the total inhabitants of the globe. This may seem like a *reductio ad absurdum,* but it is the truth. Moreover, beyond the third and fourth generations we know nothing of the health of all these ancestors. There are but few persons who could give an accurate statement of the diseases with which their four grandparents suffered and died; and beyond that generation there is soon total darkness. Something might, perhaps, be worked out according to the Mendelian laws, if we could only recover sufficient data for these millions of ancestors, but that is obviously impossible. A recent attempt of this kind has been made by Cannon and Rosanoff in a study of heredity in insanity, but in no case did they go back further than the fourth generation. There have been some other studies, as in the Jukes-Edwards case, and in the Kallikak case, in which six and even more generations have been searched, although the wonder is how authentic data were secured in these cases; but even so, these data are very limited. It is true that a few positive facts are worth more than a world of negative ones, and I do not belittle such studies. Nevertheless, heredity is a vast *terra incognita,* which has been a favorite retiring ground for theorizing pathologists. There is not a man of us who may not have had epileptic ancestors, as well as criminals and lunatics among his forefathers; but where ignorance is bliss, 'tis folly to be wise.

If we are perfectly frank with ourselves I fear we shall have to acknowledge that both the causation and pathology of epilepsy are still unknown to us. The sacred disease remains one of the opprobria of medicine. Its mysteries have not yet been revealed. Some things, however, have been eliminated for which we should, perhaps, be grateful. We do not hear, for instance, as much about the reflex origin of epilepsy as we once did. We are no longer refracting eyes, cutting off foreskins, casting out worms, and lancing gums with the assurance which once possessed us. The great problems of epilepsy will never be solved by these methods.

There has come to pass nowadays, however, a sort of humoral pathology which offers an inviting field for speculation in epilepsy. The query has arisen, Can epilepsy be caused by some form of infection, some autogenous toxin, some dyscrasia of the blood or of the secretions? Efforts have been made to recover toxins from the urine after the fit, or even to discover some offending microbe in the blood. We are spurred on by the reflection that such diseases as tetanus and, perhaps, chorea, are microbian in origin. But so far the results in epilepsy are meager if not absolutely *nil.* I need not detain you, therefore, with a discussion of cholin and neurin, of xanthin and paraxanthin; or whether the gastric contents are hypotoxic or hypertoxic just before or just after the fit; or whether, as Ceni claimed, the blood of an epileptic contains an autocytotoxin and also an anti-autocytotoxin. The disease has also been attributed to a leukomaine poisoning, to acetone and to diminished alkalinity of the blood, but these things are not proved.

The internal secretions are at present attracting much attention in general and special pathology, and it is inevitable that epilepsy should be drawn into the focus of this discussion. As early as 1811 Wenzel, in examining the brains of epileptics, observed that the hypophysis was diseased in some cases. So far as I know, Ohlmacher was one of the first who investigated the ductless glands, particularly the thymus, in their possible relation to epilepsy, but his researches do not appear to have been illuminating. Sajous, on what seem to be largely theoretical grounds, implicates the "adrenal system," as well as the pituitary body, as a cause of epilepsy. Of recent noteworthy books on this general subject I can refer you to Cushing's work on the pituitary body and Swale Vincent's complete review in his book on the internal secretions, but epilepsy does not figure largely in their pages. It is true that epileptic spasms have been caused by tumors of the hypophysis, but only as any intracranial growth may cause fits. I do not think it has been shown that epilepsy is an essential part of the picture. The fits are merely symptomatic of a local irritation, as is shown by the fact that they usually belong to the uncinate group, *i.e.,* caused by irritation of the neighboring uncinate gyre with olfactory and gustatory auræ. In some of these cases there is a bitemporal hemianopsia, with rapidly advancing optic neuritis or atrophy, due to pressure on the optic chiasm.

There are some clinical observations in this connection which are of interest. A relationship, for instance, between epilepsy and exophthalmic goiter has been claimed by Meyers, of this city.

Yawger informs me that he has seen epilepsy in a cretin; and he knows of another patient, an epileptic boy in the colony farm at Oakbourne, who has a sister with exophthalmic goiter. But the most remarkable case, to which I am privileged to refer by Dr. Yawger, is that of an epileptic woman who has 16 children, among whom 2 have exophthalmic goiter, 1 has epilepsy and 2 sons are chronic inebriates, 1 of whom has fits while under the influence of alcohol. Oppenheim notes the occasional occurrence of epilepsy in Graves' disease. On the whole, however, we do not seem to have advanced very far in detecting the cause of epilepsy in the internal secretions, but the subject has its interesting features.

I have sometimes asked myself whether syphilis may be an hereditary cause of epilepsy. Is epilepsy possibly a parasyphilitic disorder? Certainly there is nothing of a morbid anatomy for epilepsy like that which we see in such parasyphilitic diseases as locomotor ataxia and general paresis. The Wassermann test might be used in a series of cases in an attempt to determine such a point, and the cerebrospinal fluid might be examined, but the subject so far is merely speculative.

To those who practice largely among children the occurrence of otitis media cannot be infrequent, hence its influence in the causation of epilepsy should be of interest. This mishap cannot be a common one, and when it occurs it is little short of tragic. The septic infection of the meninges and brain-cortex is, of course, the route. I once had a case of the kind in a small boy from Delaware, whose fits followed on a suppurating ear and were growing worse and more frequent. Dr. Randall, to whom I referred him, cleaned out the ear and the mastoid thoroughly, and the boy made what appeared to be a complete recovery. For seven years he went without a convulsion, and we felt sure that we had triumphed; but one day last summer the boy was brought to me again with the story that the fits had returned. An examination by Dr. Randall revealed the fact that the ear disease also had returned and had been neglected. Whether the result of a second operation will be so fortunate remains to be seen.

This naturally introduces the subject of brain surgery in epilepsy—especially in traumatic epilepsy and in so-called focal epilepsy. The enthusiasm of neurologists in this field has very sensibly abated in recent years. In traumatic cases in young children, however, there can be no question that the aid of surgery should be summoned to remove depressed bone or scar tissue—and the earlier the better—but we must be prepared for disappointment in many of these cases. Possibly there is a better chance for children than for adults; but in the case of the latter, especially long-standing cases, the outlook is gloomy. Asphyxia in newborn children is a grave condition and may lead to epilepsy as well as to cerebral palsies. In these cases there may be a meningeal hemorrhage, which may possibly be relieved by surgery. Lumbar puncture may reveal a bloody fluid, and may even give relief. Focal epilepsy hardly has the significance it once had; for there was a time when, in this so-called Jacksonian type, hope was unbounded that the disease, having a focal origin, could literally be cut out. We know better now. I am quite sure, in fact, that essential epilepsy often has a focal character—perhaps much oftener than is suspected—and this focal character is no indication for trephining. I saw a little girl recently with Dr. McCarthy in whom there was apparently a pure Jacksonian epilepsy, beginning and remaining in the muscles of the face, lasting but a few moments, and not involving consciousness. The child, in fact, could talk during the attack. A trephining in this case revealed nothing, and I understand that the patient has not been benefited. The surgical treatment of epilepsy was recently discussed before the Philadelphia College of Physicians (Vol. XXXIV.) by Taylor and by Frazier. The latter has operated for intracranial hemorrhage in the newborn, and his views are rather optimistic, while Taylor's views are pessimistic.

The diagnosis of epilepsy sometimes presents a problem, to which brief attention may be called. My interest has been aroused especially of late by the subject of nocturnal epilepsy. It is remarkable for what a very long period (even extending over a whole life) a case of epilepsy may preserve this type and be successfully concealed from the world. I once attended, for some years, the family of a gentleman, and only learned that he was the subject of nocturnal epilepsy by being summoned to him in the night by a servant while his family were away from home. When I found him in convulsions I thought he had uremia, and it was only on the return of his wife that I learned the exact truth. An epileptic boy under my care at present has most of his fits at night, and only knows that he has had one by finding in the morning that he has wet the bed. Some of you may recall the story of the French nobleman who was annoyed for years with nocturnal incontinence of urine, when it was at length discovered that the poor man had been having nocturnal epilepsy. It would be unfortunate for either a pediatrist or a neurologist to make such a mistake, so it is just as well in all cases of persistent nocturnal enuresis in children to be on guard.

Dr. Weisenburg recently reported to the Philadelphia Neurological Society an interesting case of what he called intermittent claudication in a boy. This patient had had epilepsy from his third month until he was five years old. The fits then ceased, and he began to have transient attacks of hemiplegia, first on one side and then on the other. The reflexes were increased on the affected side and there was a Babinski. There were no epileptic phenomena in these attacks, and between the attacks the limbs were normal. McConnell, in discussing this case, referred to Flatau's paper on "Transient Paralyses as Epileptic Equivalents," and spoke of a case of his own. I believe that Dr. Weisenburg did not accept the suggestion that his case was one of epileptic equivalents, but I confess that I am inclined to take that view of it. The fact was certainly significant that the case occurred in a boy who had previously been epileptic, and that the attacks were not typically those of intermittent claudication, for there was no pain, and this affection is usually seen only in adults. The case was important for what it suggested.

Dyschromatopsia, especially reversal of the color fields, has been much discussed of late. Formerly we regarded such reversal as a stigma of hysteria, but recently Cushing and others have pointed it out in organic brain disease, especially in brain tumors. I have myself reported a case of large tumor, probably of the pineal body, in a boy, in which it occurred. De Schweinitz says that the differential diagnosis of epilepsy from hysteria should not rest alone on phenomena connected with the field of vision; and Camp, in a recent paper, says that while dyschromatopsia appears to be rarely present in common types of uncomplicated epilepsy, it may appear in those complicated with hysteria and also in those in which the epilepsy is due to some organic brain disease and to trauma. I imagine, however, that it would be very difficult to take the color fields in young children, but anything that helps us to distinguish epilepsy from hysteria would be welcome, because even in children the distinction is often difficult. The subject is too large to be discussed fully in the limits of this paper.

A curious affection, called infantile masturbation, has been described by some writers. In this affection the child throws itself into a spasmodic reaction by rubbing the limbs against the genitalia. I once saw a case in which I suspected it, and in which there was some trouble to explain the thing and to quiet the fears of the mother. I doubt whether in such a case there is a true orgasm. The affection, whatever it is, is certainly not epileptic.

I have purposely not reserved much space for the discussion of treatment, for there is not much to be said about it. In one of the most recent books, Sutherland, "On the Treatment of Diseases in Children," there is nothing new, but the author is content to go over the old ground. The bromid treatment still holds, but I believe in combining with the bromids small doses of the iodids. The salt-free treatment has been somewhat in vogue, but I have had but little experience with it, and must refer you to others. It is based on the theory that the withdrawal of sodium chloride promotes the retention of the bromid salt. This treatment was introduced by Richet and Toulouse in 1899, and is highly extolled by competent observers.

The treatment of epilepsy with the venom of the rattlesnake has recently attracted attention in this city in the work of Dr. Spangler. I have had no personal experience with it, and I prefer to wait until it has been more fully tested. I think control observations should be made by different experimenters.

Cushing claims to have seen improvement from the use of hypophyseal extract in cases of epilepsy complicating hypopituitarism. Wendell Reber, in a recent discussion before the Pennsylvania State Medical Society, referred to a case of epilepsy with complete bitemporal hemianopsia, in which the patient recovered full visual fields on the use of pituitary and thyroid extracts.

I will say, in conclusion, that he who pins his faith entirely to drugs in treating epilepsy in children does not see and do his whole duty. Hygienic, mental and moral control are likewise of first importance. Attention to the gastrointestinal tract, regulation of the sleeping hours, control of the schooling, outdoor life, and a wise discipline are all necessary. I may relate one case in point and then close: A few years ago I had under my care a small girl with petit mal. She was taken from school, and every detail of her daily life was carefully supervised. She did well on small doses of bromids and iodids, and the attacks were entirely broken up for about a year. But at the approach of the holiday season she became much excited at the prospective visit of Santa Klaus, and the night before Christmas she was wakeful, and stole out of her bed and down stairs to investigate. In the early hours of the morning she was found by her parents in a series of violent convulsions. That was bad management, and it made an unhappy Christmas.

SERUM THERAPY OF MELENA NEONATORUM.—R. Franz (*Münch. med. Woch.*, December 31, 1912) gives his experience in the treatment of hemorrhages in melena neonatorum. At the Frauenklinic at Graz from 1900 to 1911 there were treated 35 cases of gastrointestinal hemorrhage in newborn children. The mortality was 50.9 per cent. Injections of gelatin have heretofore been the best method of treatment, but even with the use of these there was a mortality of 62 per cent. The hemorrhage occurred in portions of the gastrointestinal tract entirely without lesions, therefore there must be some failure of the blood to coagulate in these cases. The new methods of serum therapy seem about to give better results than we have heretofore had. Experiments *in vitro* and in animals have shown that the admixture of serum increases the coagulability of blood. The author has treated 5 cases of melena neonatorum by injection of blood derived from the navel. All the cases were cured, and in 4 of them the action was very rapid. For the purpose of obtaining the serum the cord of a healthy woman, after ligation of the end next the child, was allowed to bleed into a vessel under aseptic precautions, and this serum was used for the injections. The injections were made, after disinfection of the skin by iodin, into the upper part of the thigh and buttocks, either subcutaneously or intramuscularly. The serum was from one to four months old when used. The dose was 10 to 25 c.c., repeated when necessary. The author believes that he has shown the harmlessness of these injections and their therapeutic efficiency.

DISPENSARY TREATMENT OF CHOREA.

BY ARTHUR NEWLIN, M.D.,

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During the year 1912 there were 75 new cases of chorea treated in the Wednesday clinic of the Philadelphia Orthopedic Hospital and Infirmary for Nervous Diseases. The diagnosis of these cases was made in the majority of instances before their attendance at the dispensary began, either by the physician referring them to the institution or by the family of the patient. A number of patients coming into the dispensary with the diagnosis of chorea were not cases of chorea at all, but belonged to that class that has been unfortunately designated habit chorea; others, true choreics, whose symptoms were severe, were seen first in the dispensary and thereafter admitted to, and treated in, the wards of the hospital. These two classes are not included in the present consideration, which deals only with those who, either on account of lack of room in the wards or by their own decision, or from the mildness of their symptoms, were treated as out-patients. These attended the dispensary once a week. At the time of their first application for treatment they were interviewed by one of the assistants in a separate examining room, where a history was taken and examination made. They were then sent to the chief of the clinic for re-examination and treatment. The histories of such cases are recorded in special books for the purpose, which contain only histories of chorea and in which is printed an outline of questions, with spaces for the answers to be recorded by the examiner, and the notes of his examination. Although this method is open to the criticism that set questions put a limit to the full record of all cases, yet in practical application it has obvious advantages to a blank page; it also gives scope for any amplification by setting aside a space for that purpose.

Of great importance in the history of these patients is the record of their management previous to their appearance at the dispensary. This in a majority of the cases has been inefficient. If treated at all they have been given "drops" and then the treatment has stopped. Some have been given drops and kept away from school, others have received some kind of medicament and the parents instructed to let the child be out of doors as much as possible. This, of course, means playing in the streets, obviously harmful advice. A few are instructed as to the evil of tea and coffee drinking. In rare instances is there evidence of care or thought in their management, with detailed advice as to diet, rest and general hygiene.

Diet.—Most of these children have been on an improper dietary. Tea, coffee and sweets play a prominent part in their ménu, milk being a neglected food. Either it is not offered to them or their parents relate they will not take it. Such children are usually poorly nourished, their tongues are coated and their bowels constipated. A little care in the selection of their food and the time of meals, directions as to proper mastication, exclusion of tea, coffee, cakes, candies, etc., between meals, will not only remove from their dietary these injurious articles, but will increase the appetite, regulate the bowels and improve the general nutrition. An aid to the evidence that this is being accomplished is obtained by having the child weighed once a week and a record kept of the same.

Rest and Fresh Air.—The mistake of endeavoring to give the child fresh air by keeping her out-of-doors results in the elimination from her treatment of a factor which is more important than any other in the treatment of chorea, and that factor is rest, mental as well as physical. No other part of the treatment of chorea can compare to it and no drug can take its place. Pure air is a great advantage in any disease, but in the treatment of chorea it should not be obtained by out-door exercise, but by proper ventilation of the living and sleeping rooms of the patient. The needed rest for these cases is obtained by removing them immediately from all mental and physical exertion; even the milder cases should be put to bed at once. It is of the greatest importance that this part of the treatment should be carefully followed. The mother is instructed as to the carrying out of the regulations as to diet, drug-therapy, regulation of the bowels, etc., and is then told to take the child home from the dispensary and put him to bed. There he is to remain for the next six days. At the end of that time he is allowed to be up for an hour in the afternoon and on the seventh day returns to the dispensary for reëxamination. If there is decided improvement rest in bed until noon is required for the second week, followed by two to three hours' rest on a lounge or sofa during the third week, according to the progress of the case. If no improvement is noted at the end of the first seven days, the same routine is carried out during the second week and the hours for being up and dressed are arranged for as the case progresses. No drugs or other form of treatment seems so efficacious or yields such prompt results as does this of absolute rest, especially when instituted early in the attack. Marked improvement, however, is seen in cases that have been resistant to the usual treatment by arsenic, removal from school and moderate attention to diet; even in these there is almost always a decided diminution of the choreiform movements after a week of rest in bed.

A careful search for the presence of any condition that might act as a nervous irritant should be made at the first examination. Of these, ocular defects, perhaps, are the most frequently found. Absence of glasses when they are badly needed often acts as a predisposing cause. Almost as usual is the wearing of improper lenses or the improper adjustment of good lenses in these choreic children. Other peripheral irritations are, in the order of their importance, the presence of enlarged tonsils, or adenoids, or both, phimosis or preputial adhesions, carious teeth, seat worms, etc. These should be corrected as expeditiously as possible. The occurrence of other diseases than chorea should be discovered by the history taker at the first examination, and, of course, treatment instituted toward the cure of such complications. Two diseases that might easily be overlooked at this time, and which are most important in this connection, are tuberculosis and syphilis. A careful examination of the lungs and investigation into the history may reveal the one, while the Wassermann test is a reliable aid in the discovery of the other. The coöperation of the social worker has been of great value in the care and management of these cases, not only by bringing to light home conditions and surroundings, but by seeing that the instructions as to rest and diet are faithfully carried out by the parents of the child.

Drugs.—Arsenic, aspirin, the salicylates, bromids, chloreton, cimcifuga, hyoscin, etc., may be given according to the fancy of the prescriber. Whichever of these is administered, however, it should not be to the exclusion of iron. This should be given if the child be anemic or not and continued throughout the entire treatment of the disease.

I am indebted to Dr. Morris J. Lewis, chief of clinic, for the use of material in his dispensary.

Below is a copy of a page from a chorea book at the Philadelphia Orthopedic Hospital.

CLINIC OF DOCTOR

Number Name Sex Age Nat. Race Residence Occupation
Date of Application Result and date

FAMILY HISTORY. Rheumatism Chorea Other Neuroses

PREVIOUS HEALTH OF PATIENT Nature of illness Scarlatina, date
History of rheumatism, time of onset, character and duration of attacks
Month and year of onset of former attacks, duration and supposed causes
attack of chorea Exact date of onset of present attack
Supposed cause History of fright Dates of exacerbations during present attack
Order in which members became affected and dates

Paralysis Affection of speech, parts affected and time of onset

CONDITION ON APPLICATION General aspect Digestion
Appetite Bowels Sleep Intelligence Temper
Condition of Heart
Condition of Eyes
Reflexes Dynamometer R. L.
Side and part most affected and character of attack at time of application
Tenderness over spine
Effect of volition on the motions of rest of sleep Evidences of Hysteria
Examination of urine
Menstruation
Further remarks and treatment

INDICATIONS FOR HELIOTHERAPY IN TUBERCULOUS PERITONITIS.—D'Oelsnitz (*Ann. de Méd. et Chir. Inf.*, January 1, 1913) gives the histories of 3 cases of tuberculous peritonitis treated by him successfully by heliotherapy, and one that was not successful. Many observers have reported this same rapid curative action of the sun in tuberculous peritonitis, especially in the ascitic form, when treated early in the disease. Each of these 3 cases would have been considered at first as having a bad prognosis. The good effects of the treatment were shown by the complete disappearance of the clinical signs of tuberculosis in the peritoneum after from one to three months. The good effect of heliotherapy has been seen in large tracheobronchial adenopathies as well. Many long sittings of treatment may be given. The caseo-ulcerous forms of tuberculosis with generalized lesions and rise of temperature are very favorably affected by heliotherapy, especially when combined with sea baths. Ascitic cases become encysted. This treatment may be used without fear in advanced cases and apparently very grave ones.

RECURRENT VOMITING IN CHILDREN.[*]

BY A. CLIFFORD MERCER, M.D.,

Professor of Pediatrics, Syracuse University; Visiting Physician, Syracuse Hospital for Women and Children; Consulting Physician, Free Dispensary

Synonyms.—Cases of recurrent vomiting in children have been reported as cyclic, periodical, fitful, lithemic, bilious or nervous vomiting, migrainous gastric neurosis, and vomiting with acetonemia or acetonuria. Recurrent vomiting and cyclic vomiting are the more usual synonyms met with. The former is the preferable term because the attacks of vomiting in this disease do not occur with the regularity implied by cyclic. The other would-be synonyms are not individually broad enough to include all the varieties of recurrent vomiting, which must remain grouped together until we command fuller and more certain knowledge of the causes and effects of faulty metabolism in their relation to clinical phenomena.

Distribution and Occurrence.—The reports have come from widely distributed communities,[48] from Russia and Hungary on the east to Australia, Japan and China on the west, and from Canada on the north to Brazil on the south. The earliest report thus far discovered was made in France in 1841[57] as an account of periodical vomiting without signs of inflammation or organic lesion by Dr. Cruère,[48] which appeared in a publication of the Dijon Medical Society. The first paper in English was a report of 9 cases contributed by Dr. Gee, of London, to St. Bartholomew's Hospital Reports for 1882. In later years American physicians have published their share of the important papers relating to this symptom-complex. Although recurrent vomiting cannot be classed as a very common disease it undoubtedly occurs more frequently than it is recognized.

Definition.—Recurrent vomiting may be defined provisionally as a toxic neurosis characterized by uncontrollable but self-limited attacks of vomiting, attended with great prostration and marked wasting, lasting for a few hours to several days, recurring at intervals of weeks, months, or nearly a year, and tending to cease toward puberty or to be replaced in adult life by migraine.

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[*] Read before the Annual Meeting of the New York State Medical Society, Rochester, April 29, 30, 1913.

Etiology.—While attacks of recurrent vomiting may occur in infants a few months old and in children approaching puberty, they are most frequently seen in the middle years of childhood. They are somewhat more common in girls than in boys. The patients are quite likely to be members of neurotic or gouty families of more or less wealth or indulgence, and the children themselves are often high strung and excitable. Some are easy vomiters, poor sailors and subject to car-sickness. Several patients may be found in one family. The subjects of recurrent vomiting are usually costive, may or may not have obvious digestive troubles, commonly lead an indoor life, and are somewhat more likely to have attacks in winter than in summer. An attack may be precipitated by unusual excitement or fatigue, by anger, fright, grief, shock, anxiety or overwork in school, a children's party, exposure to cold, general anesthesia with chloroform or ether, or blows on the abdomen. While some observers find that well-marked errors in diet seldom determine an attack, others believe that over-eating and food idiosyncrasies are very commonly responsible for an onset. The exanthemata, bronchitis, rhinopharyngitis, adenoids, refractive errors, appendicitis, intestinal toxemia, genito-urinary irritation, lithemia, acetonemia or acidosis and intermittent hyperchlorhydria have also been held to have a causal relation to recurrent vomiting.

Of the etiologic theories of recurrent vomiting advanced in published articles that of acidosis as revealed by the presence of one or more acetone bodies in the urine has received most attention. Howland and Richards,[15] after two and one-half years of research work, during which period more than fifteen cases of recurrent vomiting came under observation, were led to believe that at the time of an attack the patient's power of oxidation is temporarily lessened and that he is therefore unable to detoxify an excess of poison absorbed from the intestinal canal in which putrefactive toxins are formed, as is indicated by the presence of abnormal amounts of indican in the urine. With diminished power of oxidation the catabolism of carbohydrates becomes inadequate for the simultaneous and dependent combustion of fats. The catabolism of fat is therefore incomplete. Acidosis results and the acid products of the intermediate steps of fat catabolism find their way into the urine as acetone, diacetic acid or beta-oxybutyric acid. Interference with the oxidation of uric acid permits an increased amount of this acid to pass with the urine. Sedgwick[26, 34] calls attention to the hypothesis that protein metabolism is also dependent upon carbohydrate catabolism and finds that in recurrent vomiting creatinuria is associated with acetonuria. The light-colored stools commonly passed before and during the attacks also indicate hepatic insufficiency.

Other observations have shown that acidosis occurs in many pathologic conditions, in some of which it seems to be a matter of moment and in others not, and it may be present in the apparently well. During a year or so the urine of 662 unselected cases were examined for the presence of acetone as the patients were admitted into London's Great Ormond Street Hospital for Sick Children. Acetonuria was discovered in 408, or in 61.6 per cent. of these patients. The cases comprised most of the diseases met with in children between the ages of a few days and twelve years. Dr. Frew[44] shows that the occurrence of acetonuria did not depend upon the nature of the disease, but was definitely associated with the changes of the diet which occurred on entering the hospital. Acetonuria was found to be present in 100 per cent. of the infants changed from a diet of human milk outside the hospital to one of cow's milk within the hospital. A temporary inability to digest carbohydrates seemed to be the cause of a correspondingly temporary carbohydrate starvation which was slight or more marked in proportion to the degree of carbohydrate change there was in the hospital diet as compared with that which the child had had at home, and the carbohydrate starvation appeared to be the cause of the acidosis. The starvation was shown not to be due to the absence of carbohydrates from the diet; nor was it due to a diminished power of absorption or assimilation of carbohydrates, for in a majority of the cases the administration of dextrose would cause the acetonuria to disappear in about twelve hours.

The Great Ormond Street Hospital experience naturally suggests two questions: First, do similar changes in diet affect children outside the hospital in the same way? Second, if such effects do not occur at home, what other etiologic factor was present in so many children as they entered the hospital? The first question has not been answered. In answer to the second, one might suggest the possibility of a nervous disturbance due to the sick child leaving home and entering a hospital. Under such circumstances an infant will sometimes cry violently and almost incessantly for hours, or even days, refusing to be pacified, and older children may suffer from fright, grief or homesickness. These are matters of nervous strain for little folk and quite sufficient in some cases at least to upset metabolism.

From a neurotic viewpoint recurrent vomiting seems to be related to migraine, and they may have common causes. Correction of refractive errors has relieved both, but, on the other hand, acidosis has occurred in both at the times of an attack. Fatal cases have been comparatively rare. Only about a dozen have been recorded. In them the finding of an enlarged fatty infiltrated or degenerated liver as the chief lesion has related these severe and fatal cases of recurrent vomiting to post-anesthetic poisoning. Both have received the title "cryptoegenetic acidosis." The fact, however, that the excretion of acetone by the lungs, kidneys or skin sometimes does not occur in the prodromal period, but only after the onset of emesis, and is present at and after the crisis supports the view that acidosis is an incidental, rather than a fundamental, cause of recurrent vomiting.

Two attacks of recurrent vomiting in a boy six years old were studied by Mellanby.[43] Normally at this age creatinin and not creatin is found in the urine. In the urine of this boy creatin was constantly present, and several days before any other hint of an approaching attack was observed the excretion of creatin gradually increased, while the output of creatinin decreased. Thus was the onset of symptoms predicted. On the other hand, acetone did not appear in the urine until the attack was fully developed, and the acidosis was cleared up on giving glucose without causing an abatement of the symptoms. Further, in an interval acidosis was produced by cutting out glucose and other carbohydrates from the diet without bringing on an attack. Mellanby thinks that the excretion of creatin was due to the action of some toxin present through liver abnormality, which periodically became so pronounced as to make the child very ill. He says, "Undoubtedly one of the most important functions of the liver is to neutralize poisonous substances which may be either absorbed from the intestine or be formed in the metabolic changes of the body."

Rachford[61] believes that "failure on the part of the liver to neutralize or destroy systemic and intestinal toxins is the most important cause of recurrent vomiting. His "hypothesis assumes that the liver from various causes, the chief of which is overwork, more or less suddenly develops a functional incompetency which renders it incapable of converting ammonia and the purin bodies into urea and destroys its so-called filtering function, which normally renders innocuous the fermentative products which pass through it from the intestinal canal. As a result of this liver inactivity both systemic and intestinal toxins escape into the general circulation and produce an autointoxication." He thinks that the widely varying symptom-group seen in individual cases may be explained by the fact that it is not always produced by the same autotoxin. In one group of cases the intestinal toxins may dominate, and in another the systemic; in still another the autointoxication may be almost or quite overshadowed by nervous symptoms produced by powerful exciting causes. In these cases the symptoms of hysteria and other neuroses may be commingled with those of autointoxication."

The etiology of recurrent vomiting is a subject which will bear further elucidation. The quotation from Rachford offers a suggestive working hypothesis. The possibility of predicting an approaching attack by the presence and gradual increase of creatin in the urine deserves wider attention.

Symptoms and Course.—Prodromata have been observed in only a portion of the cases reported. This may be due to the fact that many parents are inattentive or blind to minor initiative symptoms. For hours, a day or two, or sometimes nearly a week, before an attack the child may be languid, pale, sallow, have dark rings about the eyes, may be irritable and easily fatigued, may be restless in his sleep, have a furred tongue, poor appetite, be constipated and pass light-colored stools. Or the stools may be loose, spongy and sour. The breath may be offensive or sickish with the odor of acetone. There may be fever, flushing of the cheeks, epigastric discomfort or distress, nausea, headache, twitching of eyelids, stammering, or even a convulsion; or the child may be stupid or mildly comatose, or may have coryza, dyspnea and sighing respirations. Sometimes the child is unusually thirsty. The urine may be decreased or increased in quantity, may be strongly acid, or emit the odor of acetone.

With or without premonitory symptoms vomiting begins abruptly, commonly in the night, and is violent or projectile and frequent, being either almost continuous or with intervals varying from fifteen minutes to a few hours. An attack lasts, as a rule, from several hours to four or five days, although exceptionally it may continue for one, two or three weeks. The vomitus consists at first of food, but soon of mucus and serum, which is later streaked with blood, or more rarely replaced by clear blood, and toward the end stained with bile. It may or may not contain free hydrochloric acid, may or may not smell sour, and may or may not emit the peculiar odor of acetone. The vomiting is uncontrollable. The stomach retains absolutely nothing swallowed, be it food, water or medicine. The abdomen may be somewhat tender as the result of straining in the act of vomiting, but is not frequently the seat of severe pain. While anorexia is complete the child usually suffers from great and distressing thirst. The tongue is coated, sometimes cracked, and the lips may be dry and parched. The breath often has the odor of acetone. The bowels are usually constipated, and the stools are whiteish or clay-colored and offensive. Exceptionally, they may be somewhat loose and sour or offensive.

The temperature at first is usually but slightly elevated and later is normal or subnormal. But the rare fatal cases with enlarged fatty liver die with a hyperpyrexia of 106°F. or 107°F. Vasomotor disturbances may cause coldness of the feet or of one side of the body. The skin may be dry and harsh, or cold and clammy. Occasionally slight icterus develops. Toward the end of an attack there may be present slight edema or a pruritis with or without a rash, and the pruritis may be annoying for a time after vomiting has ceased. The pulse becomes rapid and weak, and may be irregular. Respiration may be rapid and shallow, or slow and sighing, and sometimes irregular. Dyspnea without a pulmonary lesion, an air hunger, may be present. Exceptionally, the presence of sore throat or tonsillitis is noted.

The patient may or may not have headaches. Vomiting interrupts and seriously interferes with sleep, restlessness is usually great, especially at the beginning of an attack, and choreiform movements of the muscles of the face, neck and upper extremities were obsedved in one case. Intolerance of the bedclothes is sometimes seen. The eyes may be half closed with the balls partly rolled up, and the conjunctivæ may be injected. Convulsions sometimes occur at the beginning of or during an attack. The patient may be delirious or drowsy and stupid. The fatal cases with enlarged liver die in coma with or without convulsions.

Prostration is likely to be severe and may be extreme and dangerous. Wasting is rapid, the abdomen being retracted and the eyeballs sunken.

The urine is at first scanty, but toward the crisis is profuse and loaded with urates. It is strongly acid and commonly contains an excess of indican, uric acid, xanthin bodies, creatin, acetone, quite likely diacetic acid and sometimes beta-oxybutyric acid. Much less commonly it may contain albumin and casts, or bile. Howland and Richards found an increase in the unoxidized sulphur and a decrease in sulphuric acid. The odor of acetone in the urine or vomitus, or from the lungs or skin, may be so strong as to be noticeable throughout the patient's room. The blood commonly exhibits a leukocytosis with a relative increase of the small lymphocytes.

Abortive attacks or recurrent vomiting occasionally occur in which patients are irritable, restless and suffer for a few hours with nausea without vomiting.

The usual attack in which the child is likely to be sick unto death ends by crisis. The paroxysms of vomiting become less frequent and the intervening periods of sleep longer. Other symptoms disappear quickly, and convalescence seems remarkably rapid. Appetite and normal digestion return almost as abruptly as an attack begins. Within a few days or a week the child is his usual self again. Only very exceptionally does an attack end by lysis.

Prognosis.—Prognosis is good. Death is very rare. Usual attacks, although sometimes extremely severe, are self-limited, and they tend to cease as the patient approaches the age of puberty.

Diagnosis.—In a first attack of recurrent vomiting diagnosis is likely to be difficult and sometimes impossible. Vomiting in well-marked and typical cases of acute indigestion, acute gastritis, invasions of fever, pyloric stenosis, appendicitis, intussusception, intestinal obstruction, renal disease and meningitis should be, as a rule, fairly promptly and easily excluded. But in ill-defined and atypical cases the problem may be for a time so puzzling as to make subsequent events necessary to clear up a diagnosis. In later attacks with a past history of recurrence diagnosis is usually much more easy. A gouty or neurotic family history; a high-strung, nervous, excitable child; recurrent attacks of violent, prostrating, wasting, uncontrollable but self-limited vomiting; without organic lesion, but commonly with acidosis revealed by the odor of acetone in the breath, vomitus or urine; following some marked offence to the nervous system, rather than an obvious dietetic error, is a pretty definite and distinctive picture.

With less emesis associated with severe headache recurrent vomiting may be confused with migraine, and it is probable that the two disturbances merge the one into the other. Yet well-marked cases of the two conditions present quite different pictures, as is exemplified by the following histories:—

A Case of Migraine.—On the 25th of May, 1911, I saw C. F., a girl of nine years. Her parents belonged to gouty and neurotic families, and they themselves are both neurotic. The patient has a brother suffering with an organic disease of his nervous system and she herself, as does also her father, gives a history of a past neurosis resembling petit mal. At the age of seven she had frontal sinus trouble, and at eight had her palate clipped and adenoids and enlarged tonsils removed. Immediately following the operative work she began to have so-called stomach upsets, which at first occurred every other day for about two weeks, and which thereafter occurred every other week and later every third week, and later still every six weeks. Recently they had again occurred more frequently—every two weeks or every week. The attacks are characterized by headache of varying intensity, always coming on between three and eight o'clock in the morning and lasting from a few minutes to two hours. She does not always vomit, but usually does and then she gets relief from the headache. The vomitus resembles the white of an egg, has no odor and contains no food. The child may or may not be ready for her breakfast, but is always ready for subsequent meals.

A Case of Recurrent Vomiting.—On the 24th of December, 1910, I saw A. H., a nervous, excitable boy of eight years, both of whose parents are markedly neurotic and belong to well-to-do, gouty and neurotic families, and whose younger brother also suffers with recurrent vomiting. He was breast-fed for five months, and was afterward given modified cow's milk. Indigestion began at two months and became worse at five months, when first fed cow's milk. He had diarrhea but no vomiting. He continued to have attacks of diarrhea every two or three months until he was four and a half years old. He had an attack of vomiting at the end of his first year. At four years he began to have attacks of recurrent vomiting, of which he had four in the following two years, about six months apart. From the age of six years he has continued to have attacks at intervals of from three weeks to three months. A few days before an attack he becomes irritable, easily goes into a rage, is sallow, has a dark color under the eyes, lassitude and anorexia. Sometimes these prodromata follow fatigue or excitement, as after a Christmas dinner or a children's party. Vomiting is severe, and absolutely everything ingested is rejected for about three days. His temperature is slightly elevated, not over 100°F. He has stomachache and occasionally headache, a weak and irregular pulse and great and sometimes alarming prostration. For the first day or two his breath has a sickish odor. He passes gray-colored stools. In the middle of an attack the vomitus is streaked with blood. Later it is green with bile, when his mother has come to know that the crisis is near. Dieting has seemed to have no influence over the occurrence of the attack. My first and only visit was made just after a severe attack. I subsequently learned that five months later a slight attack occurred in which he had three days of anorexia and nausea without vomiting and with a comparatively good pulse and no prostration. Just after this attack his milky urine was examined by Dr. C., of S., who reported that he found much albumin. The brother's attacks are similar, but among the brother's prodromata are a coated tongue and light-colored stools.

Treatment.—All treatment in a well-developed attack has failed to stop the vomiting. The usual remedies given for emesis have been tried in vain. Nothing stays in the stomach. Based upon the hypothesis that recurrent vomiting is an acid autointoxication, large doses of bicarbonate of soda have been administered. Ten to thirty grains have been given three times a day during the intervals, and every hour or two at the onset of an attack until 100 grains have been given, or 120 grains in twenty-four hours. Afterward a sufficient amount has been given to keep the urine alkaline. The alkaline treatment has been remarkably successful in some hands and a failure in others. It seems to be more likely to be successful when started in the prodromal period and a failure when begun too late. In fact, one is led to believe that if the prodromata are promptly recognized and the diet is immediately curtailed, or food is temporarily omitted, the intestinal tract cleared and bicarbonate of soda given freely, an approaching attack can be prevented, even if the bicarbonate of soda has been discontinued during the preceding interval. This was apparently true in one of my cases, in which a watchful and efficient mother, the wife of a physician, cared for her child. The treatment is not simply alkaline. It is also one of dietetic rest, liver rest and toxic elimination, which is suggested by the occurrence of essentially the same events in the natural course of an attack, catharsis in treatment replacing emesis in the disease.

Successful abortive treatment suggests prophylactic treatment along the same lines to be given at regular intervals somewhat shorter than the shortest interval noted in the history of a particular case.

If treatment is begun too late for the stomach to retain the bicarbonate of soda, a dram or two of the remedy dissolved in 8 ounces of normal saline solution may be given by rectum. If vomiting continues, the thirsty tissues may be supplied with normal saline solution by high enemata or subcutaneous injections.

If incomplete catabolism of fat with acidosis were a fundamental etiologic factor, an enema of dextrose might be indicated.

Occasionally an hypodermic dose of morphin may be of service.

In the intervals much can be done to improve the condition of patients by eliminating from their lives, so far as may be, all factors that have been known in one way or another to be etiologic in recurrent vomiting, as, for instance, constipation, over-eating, questionable diet, occasions for over-excitement, too much indoor life at home or in school, eye-strain, adenoids or, in fact, anything, physical or psychical, which may lower resisting power or be a source of reflex irritation, and, on the other hand, by using all available means to build up resisting power and develop a hygienic and sane mode of living.

BIBLIOGRAPHY.

1. Transactions American Pediatric Society, 1893, p. 185, Snow.
2. ARCHIVES OF PEDIATRICS, 1897, p. 561, Rachford.
3. ARCHIVES OF PEDIATRICS, 1897, p. 661, Rachford.
4. ARCHIVES OF PEDIATRICS, 1897, p. 742, Rachford.
5. ARCHIVES OF PEDIATRICS, 1898, p. 839, Whitney.
6. ARCHIVES OF PEDIATRICS, 1902, p. 824, Shaw.
7. ARCHIVES OF PEDIATRICS, 1903, p, 371, Edsall.
8. ARCHIVES OF PEDIATRICS, 1903, p. 385, Guinon.
9. ARCHIVES OF PEDIATRICS, 1903, p. 505, Pierson.
10. ARCHIVES OF PEDIATRICS, 1904, p. 881, Rachford.
11. ARCHIVES OF PEDIATRICS, 1905, p. 58, Murphy.
12. ARCHIVES OF PEDIATRICS, 1905, p. 357, Sherman.
13. ARCHIVES OF PEDIATRICS, 1905, p. 561, Morse (with bibliography).
14. ARCHIVES OF PEDIATRICS, 1906, p. 530, Myers.
15. ARCHIVES OF PEDIATRICS, 1907, p. 401, Howland and Richards.

16. ARCHIVES OF PEDIATRICS, 1907, p. 914, Myers.
17. ARCHIVES OF PEDIATRICS, 1908, p. 104, Saunders.
18. ARCHIVES OF PEDIATRICS, 1909, p. 446, Jones.
19. ARCHIVES OF PEDIATRICS, 1910, p. 66, Proskauer.
20. ARCHIVES OF PEDIATRICS, 1910, p. 551, Barbier.
21. American Journal Medical Sciences, 1900, p. 352, Breton.
22. American Journal Medical Sciences, 1900, p. 553, Griffith (with bibliography).
23. American Journal Medical Sciences, 1903, p. 629, Edsall.
24. American Journal Medical Sciences, 1904, p. 966, Snow.
25. Journal American Medical Association, 1903, p. 845, Ely.
26. Journal American Medical Association, 1910, p. 1,178, Sedgwick.
27. Journal American Medical Association, 1912, p. 628, Rhamy.
28. Journal American Medical Association, 1913, p. 1,302, Editorial.
29. ARCHIVES OF PEDIATRICS, 1905, p. 241, Editorial.
30. ARCHIVES OF PEDIATRICS, 1906, p. 745, Ashby.
31. Archives International Medicine, 1908, p. 214, Janeway.
32. Archives International Medicine, 1908, p. 330, Ewing (with bibliography).
33. Archives International Medicine, 1908, p. 448, Ewing (with bibliography).
34. American Journal Diseases of Children, 1912, p. 209, Sedgwick (with bibliography).
35. British Medical Journal, 1905, Vol. I., p. 347, Shaw and Tribe (with bibliography).
36. British Medical Journal, 1905, Vol. I., p. 350, Langmead (with bibliography).
37. British Medical Journal, 1906, Vol. I., p. 1,142, Beesly.
38. British Medical Journal, 1906, Vol. II., p. 866, Gordon.
39. British Medical Journal, 1907, Vol. II., p. 819, Langmead (with bibliography).
40. Lancet, 1909, Vol. II., p. 807, Bomby.
41. Lancet, 1910, Vol. I., p. 1,346, Harris.
42. Lancet, 1910, Vol. II., p. 811, McCaw.
43. Lancet, 1911, Vol. II., p. 8, Mellanby.
44. Lancet, 1911, Vol. II., p. 1,264, Frew.
45. Lancet, 1912, Vol. I., p. 483, Garrod.
46. Proceedings of Royal Society of Medicine, 1910, p. 78, Russell.
47. Practitioner, 1912, Vol. II., p. 24, Langmead (with bibliography).
48. Index Catalogue and Index Medicus of the Library of the Surgeon-General's Office, U. S. A.
49. International Clinics, 1899, Vol. III., p. 127, Marcy.
50. Rotch's "Pediatrics," 1901, p. 774.
51. Carr's "Practice of Pediatrics," 1906, p. 199.
52. Cotton's "Medical Diseases of Infancy and Childhood," 1906, p. 238.
53. Kerley's "Treatment of the Diseases of Children," 1907, p. 472.
54. Guthrie's "Functional Nervous Disorders in Childhood," 1907, p. 162.
55. Pfaundler and Schlossmann's "Diseases of Children," 1908, Vol. III., p. 179.
56. Chapin and Pisek's "Diseases of Children," 1909, p. 195.
57. Koplik's "Diseases of Infancy and Childhood," 1910, p. 503.
58. Cautley's "Diseases of Children," 1910, p. 158.
59. Holt's "Diseases of Infancy and Childhood," 1911, p. 321.
60. Morse's "Histories in Pediatrics," 1911, pp. 41, 44, 46, 222, and 223.
61. Rachford's "Diseases of Children," 1912, p. 251.

ADDISON'S DISEASE IN A BOY AGED TEN YEARS.—This condition is extremely rare in childhood. In the case recorded by F. Langmead (*Lancet,* February 15, 1913) the pigmentation amounted only to slight diffuse brownness of the skin, which had increased gradually for twelve months. For several months the boy had had attacks of diarrhea and had been slowly getting weaker. On the evening before admission, vomiting started abruptly, accompanied by restlessness, and followed by loss of consciousness. On admission he was unconscious, the elbows, wrists and knees being rigidly flexed, and the fingers extended. The temperature was subnormal and the pulse rapid and weak. The abdomen was retracted. The knee-jerks were present, and the plantar response was flexor. Frequent convulsive seizures occurred until death. The suprarenals were almost completely caseous, and tuberculous foci were found in lymph nodes and the lungs. The heart weighed only 3 ounces.

THE PHYSICIAN AND THE MENTALLY DEFECTIVE CHILD.*

BY ISABELLE THOMPSON SMART, M.D.,

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There is no greater or more vital question before the American people to-day than the question of the child of defective mentality. It is demanding the earnest consideration of state legislators, sociologists and educators, but up to a very recent time physicians have been content to allow the layman to enter this field of pediatrics and control practically all that has been, and is at present being, done for this type of child. Only recently, at a meeting held in the New York Academy of Medicine to discuss the diagnosis of mental defect, psychologists contended that physicians, as a class, did not know how to diagnose the questionable type, and the contention was practically left unchallenged, and this, if true, is a very grave accusation and reflects in a very uncomfortable manner on the acumen of medical men and women. The type of case which I wish to present for your special consideration is not that type which is obvious even to the most uninitiated, nor yet the type which is more or less markedly defective, but the child who is a puzzle, the unusual child; perhaps the nervous child; that member of the family who carries very few of the classical symptoms of defect—very few, perhaps none at all, of the typical stigmata of degeneration.

Every pediatrist in the state will recognize this child as needing skilled treatment; *some* will realize the *peculiar* needs of the case, while many will ignore, or fail to recognize, the possibility of serious sequelæ to present conditions. The general practitioner will pass over the case lightly, with an optimism which is both myopic and dangerous, without in the least recognizing anything unusual or deserving of profound study, and will do untold harm by recommending parents to wait until the seventh or the fourteenth, or even the twenty-first year, before expecting that everything will be right. I have had such statements told and retold me again and again, until I have felt heart-sick over the lack of understanding of the normal development of healthy mental and physical child-life. Just what magic is to be looked for on the seventh birthday, or even at the fourteenth, is a puzzle to me. In ages past the mystical seven meant much to those who had not had opportunity for the deep and detailed study in development and growth of fetus, embryo—and child. There is positively no excuse for mysticism to-day, and I here put myself on record in making a *strong and earnest plea for the most careful and painstaking examination and study of every unusual child presented to any physician,* either by the parent or the school workers. A statement I frequently hear, and I am obliged to admit that there is some truth in it, is "Oh, doctors do not know about defective children, unless they are institution cases; they pay no heed to the puzzling child, to the nervous problem in the school, to the truant or the backward or unruly boy or girl. When asked for advice, we cannot obtain anything helpful; they tell us no more than we know ourselves." This is frequently too true, and for the reasons enumerated, physicians, as a class, *do not recognize the serious possibilities in each case presented,* and *they do not study* or attempt to find out.

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* Read before the Annual Meeting of the New York State Medical Society, Albany, April 29-30, 1913.

This is a day of specialists, yet there are many physicians who are not specializing, and who should be alive to the opportunities and possibilities of more constructive work. By doing so they could do a vast deal to help solve the enormous problem of the proper treatment and care of a large percentage of our school children who are unusual, who are repeaters, or hold-overs. Some of these cases seem to defy the methods and means at our command for properly classifying them as to their mental status. They are in large measure borderline cases, and only by the closest scrutiny, by the use of the most approved methods in teaching and home and school hygiene, as well as by the most careful and scientific medical care, can we determine whether they will retrogress, remain practically stationary for months, perhaps for years, or whether, with a chance to gain proper nourishment, the correction of bodily defects—for in a vast number of cases mental abnormalities of childhood are connected with bodily defects—the timely recognition and treatment of nervous and mental instability, the proper personal and home hygiene, they will not find themselves, and, after a time, physical conditions improve markedly and mental faculties become active, and we may find the subject able to take his place and hold his own in fair and open competition. A very interesting experiment was conducted by two lay women who had had considerable experience with children of defective mentality. This took place at Ellis Island in May, 1912. The experiment was planned to detect defective mentality among newly-arrived immigrants, and was largely pseudo-scientific, so far as I have been able to ascertain, that is, no history of any case was taken, and I doubt if such a thing was available, and no thorough physical examination was conducted; no tests made of the nervous system, nor of any of the usually accepted tests of mental ability. The subjects had all come through the unpleasant experiences of a long sea voyage, and were practically like the veritable "fish out of water," so new and strange were their surroundings. These facts must be considered in fairness to the suspects. The account of the testing I now quote:—

"In May of 1912 the writer (of the article from which I quote), with two assistants from the Vineland Laboratory, made a visit to Ellis Island and were led to ask to be allowed to make an experiment, and the request met with a ready response on the part of the authorities on the Island. The request was this: That they be allowed to spend the day there, the one standing on the line and selecting such of the persons who came through as seemed to her mentally defective, *her sole method of determining this being by her observation of them as they passed,* based on her experience with mental defectives at the institution at Vineland. The other assistant was to be in a near-by room with the Binet tests, and, without knowledge of whether the persons sent in were normal or defective, was to apply the test with the aid of an interpreter and see what the result might be. This was done.

"In the course of the day 12 immigrants were selected for testing; 9 of these were picked out because it was thought they were mentally defective. Three were selected as control cases, the opinion of the selecter being that they were normal. The result as found by the Binet scale was as follows:—

"Of the 9 suspects, every one was from at least four to nine years backward. Of the 3 controls 1 was seven years old and tested six; 1 was nine years old and tested ten; 1 was adult and went entirely through all of the tests.

"Encouraged by this experience, it was planned to devote an entire week to this experiment. It was not feasible to take it up at that time and consequently it was postponed until September just past.

"A somewhat similar procedure was carried out, with the following result:—

"Although the work was not done under the most favorable conditions, remarkable results were obtained. There were many interested observers of every test; the interpreters were unused to the tests and many delays were encountered.

"Forty-four persons were tested. Thirty-three of these were selected by the regular medical inspectors of the department. Of these 33, 15 proved to be defective, while 18 were normal. Eleven cases were selected by the lay experts in feeble-mindedness; of these 11 only 2 were not defective and 1 of these had been taken to compare with a very defective sister rather than because the case itself seemed defective.

It is thus seen that of those selected by the physicians less than half were correctly selected, while of those selected by the experts seven-eighths were rightly chosen."

While the contention of these lay workers may be accurate and the persons examined by them during these tests may have belonged to the type of true mental defectives, I am not willing to grant that they knew merely by this one test, without shadow of doubt, that this was so. All may have been backward; all may have been defective; but I would not be willing to grant this to any lay worker, no matter what their previous experience, without the case in question being given a most thorough and exhaustive examination by a scientifically trained physician who could get at causes and pathologic conditions as well as effects. Yet, the lay worker is constantly scoring the physician in this problem, and it is time for *all* physicians whose work is primarily with children, to be up and doing; to be able to meet the snapshot diagnoses by the untrained or the partially trained *so-called* expert.

In the practice of almost every physician who is not closely specializing there are, without doubt, numerous cases brought to him during a term of years which should demand and receive a careful and detailed study, especially where these children belong in families where he may be the one and only medical adviser. The child who shows retarded development from early infancy, *i.e.,* failure to respond to the stimuli of light and color at the usual time, the child who is late in talking, late in walking, or who, before the age for walking or talking, fails to evidence sensory curiosity, such as handling, rattling, tasting, or otherwise investigating the various objects of its environment; a child showing perversion of disposition, such as marked temper, unusually tearful or morose, or secretive, disinclined to be social, needs detailed study. This child needs to be watched all through the formative years; its progress, or lack of progress in school noted, every nervous manifestation carefully noted, mental acumen measured again and again; eyes, ears, nose, throat, secretions, blood, heart, liver and lungs—all come in for a share of attention, for only as one is thorough and painstaking can he or she accomplish their true purpose.

Many interesting experiments have been under way for some time past concerning the analysis of abnormal development of mind and body as to the rôle played in the production of such abnormalities by the hyper-secretion or under-secretion or total lack of secretion of many of the hitherto little thought-of glands, especially the pituitary, while the thymus, thyroid, adrenals and others have been very carefully studied and considerable definite and helpful data secured. The study of conditions of the blood in this connection has been made by Pende, of the Royal University of Palermo, and the data he has collected is considered a "very important factor in all pathologic analysis."

The physician of to-day cannot afford to be behind the times in his general intelligence in all that pertains to the child; he or she cannot afford to be too optimistic concerning the child's mental and moral development, as this means only a serious waste of valuable time; they must keep abreast of all medical literature. Nor is this enough; they should be abreast of the times in the big social problems which are confronting us, especially the economic and eugenic questions concerning the children of our nation, and the best way to begin is by a study of the problems as they present themselves in our own community.

I think it is Oliver Wendell Holmes who is credited with the terse saying: "If you want to reform a man, begin with his grandfather." He spoke a scientific truth; he expressed a basic principle of eugenics. We have before us the grandfathers and grandmothers of future generations. In how far do we shoulder our responsibility? The cry of the unfit is heard abroad in our land, no matter where we turn. How are we to answer to the cry? Only a few weeks ago an investigating committee, appointed by the executive head in Albany, showed its complete ignorance of this tremendous problem and made recommendations for wilfully retarding one of the best pieces of work begun by our State in the last decade, and, if these recommendations are heeded, it will sound the death knell to the progress of properly caring for a vast number of defective children for years to come. I here quote its recommendations for Letchworth Village:—

"The purpose of this institution is undoubtedly an admirable one—to build near the City of New York, at a cost of about $3,000,000, a large institution for the unfortunates who are now committed to up-state places. A large amount of money has already been appropriated, but has not been expended, and this institution is being built upon the cottage plan for caring for inmates. While this plan may have certain good features, yet the investigation that we have made leads us to believe that the initial cost of building on the cottage plan is treble that under which similar institutions have been constructed in the past, and that the cost *per capita* of maintenance will also be very high. We believe that the matter ought to be carefully studied from all viewpoints before large additional appropriations are made."

Our State has thousands of unfit who should be cared for; their mentality is far below the normal and eventually they will *demand* the expenditure of large sums of money by the State, not only to be used for the care of themselves, but of a far vaster progeny, for it is now an accepted fact that persons of a low level of mentality multiply six times faster than those on a high level. Are we physicians to sit by and keep silent when politicians of the rankest stamp promulgate such penny wise, pound foolish policies? Are they to be permitted to have the last word concerning the proper care of children of defective mentality? The question is a burning one, and I implore the physicians to make themselves wise in knowing this problem and in knowing the children in their communities who may belong to any of the various types of mental defect, so that an intelligent protest may be made against any laws which may endanger not only this class of children, but the child of normal mind who may later mate with the unfit, and so on *ad infinitum* keep this vicious circle ever widening.

101 West 80th Street.

MENTAL INFLUENCES IN THE TREATMENT OF CHILDREN.*

BY ALEXANDER MACALISTER, M.D.,
Camden. N. J.

In dealing with "Mental Influences in the Treatment of Children," I am conscious of what some will call the limitations of mental treatment, and while I shall not altogether agree with them, I shall not, on the other hand, go to the extreme of belittling the known effects of drugs. Medicine, I believe in the words of a French clinician, "Sometimes cures, it often relieves, it always consoles," and I further believe that medicine will always be used for these three purposes. We have unquestionable knowledge of the effect of drugs upon living substance, and while we may suggest to a patient that a simple preparation given him is an emetic and thus induce vomiting we cannot give a poisonous substance and save his life by convincing him the preparation was harmless. No amount of suggestion will defeat the known effects of drugs, but we can do much to supplement their effects.

We should give greater attention to the mental effects of disease and to the influence of the mind upon disease, although the latter proposition is not so evident. One's whole mental makeup may be affected by disease, and it is equally true that disease may be profoundly affected, if not cured, by the influence of mind. We may look in vain for cures of organic complaints by the Christian Scientists and the Mental Scientists, but we must admit that they do vanquish many of the other ailments of the human frame. Many physicians regard mental treatment as applicable to only a limited range of nervous ailments, but my humble belief is that it is applicable to a class of patients but little given to nervous troubles—in other words to children. The child mind is very simple and any attempt at mental influence must be expressed in the most simple words. I believe that the constant assurance of the physician to the child that he *will* soon be well goes far toward assisting the work of the medicine administered. The child should be surrounded by bright and cheerful influences, which go far toward keeping him in a happy frame of mind necessary to his complete recovery. There is no sadder sight than the peevishness and irritability often observed in young invalids which I believe has been often brought about by the morbid attitude of those around him.

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* Read before the Annual Meeting of the New Jersey Pediatric Society, June, 1912.

I am aware of the limitations of mental treatment to children who are not inclined to morbid fits of the mind, but who really dislike illness. I am also aware of the limitations imposed by the reasoning faculties of the child, but, at the same time, this very undeveloped state of the child's mind makes him genuine and unaffected in manner and gives an unexaggerated index to his bodily condition. So far as he may comprehend and receive the child will show an almost immediate benefit from mental suggestion. The child comes in with tears in his eyes telling mother he has been hurt at play. The mother looks at the "bump" and with a kiss assures him it is well. He runs cheerfully out. Has she not cured by mental suggestion? On the other hand, have we not seen children thrown into hysteria by the absurd statement that the "Dark" would hurt little boys? The child has naturally a hopeful outlook and let us encourage rather than discourage it.

All of us have tried with more or less success to convince a little sufferer that the medicine was not "so bad after all," and that it surely would make him well in a hurry. Following up this crude expedient we may go further in the work of what the mental scientists call "changing the thought" and systematically suggest and bring about cheerful mental states in the little patients. But, we must recollect that susceptibility is dependent on the strength of will and varies according to age, temperament, sex, habit and surroundings.

Here, in this field of studying the applicability of mental treatment to the child is a new sphere for the physician who is trained in diagnosis and who can determine where the usefulness of drugs may end and suggestion may be needed. The physician will never make the mistake of assuming or believing that mental influence will produce organic changes nor will he ever be guilty of the folly of depending upon mental suggestion alone in the case of a child.

I would not assume that every physician is fitted for the practice of mental suggestion, but most of them are certainly better fitted to make a study of it and acquire some degree of proficiency in it than the person without knowledge of diagnosis.

In the hands of the untrained person, ignorant of diagnosis and medicine, mental suggestion may be, and often is, productive of tragedy, and the operations of these persons promise to become a subject of action by our law-makers. True, these persons do not give medicine, and thus are out of reach of present laws as a rule, but they often do worse in depending upon suggestion when diagnosis would plainly show the need of medicine as the initial step in the case.

To make a success of mental suggestion we must be convinced of its possibilities, undeterred by the failures of the untrained persons, and we must also believe in our own mental force. We must feel kindly disposed toward the patient—in other words, be uninfluenced ourselves by any of our own disagreeable experiences, and then we must analyze the mental state of the patient. All of this, of course, after the physical diagnosis. We must absolutely believe in the power of mental suggestion as an aid to our medical treatment, and we may fortify our belief in mental treatment by reflecting on such phenomena as the palpitation of the heart under stress of emotion or the contraction of a muscle when stimulated by an electric current.

We should remember that recovery is what the patient hopes for, and, consequently, we should, above all else, in suggestion cultivate a belief in coming recovery. We may have the patient believe that recovery is surely probable because, not only of the effects of the drug given him, but also because of his recuperative abilities or constitutional make-up.

The great danger, of course, is in faulty diagnosis and thus erring in the proportions of medicine and suggestion, but here, as has been suggested, is where the physician will make a success of this combined treatment, and in the course of time he will reduce his experiences in suggestion to a comparatively exact science. Following physical diagnosis comes the necessity on the part of the physician of kindliness, tranquility and patience. Of course, this presupposes on the part of the already overworked physician an inexhaustible reserve fund of good humor and enthusiasm. His personal influence goes far with a patient. His confidence of manner impresses itself on the patient and has a wonderful effect as a curative influence. If his unconscious suggestion for good has such influence, how much more potent may it be if employed consciously and intelligently!

580 Federal Street, Camden, N. J.

TUMOR OF THE CEREBELLUM.—CASE REPORT.*

BY SAMUEL S. ADAMS, A.M., M.D.,
Washington, D. C.

B. G., nine years, colored, Virginian, was admitted to the Children's Hospital, D. C., October 26, 1912.

Family History.—Father, aged thirty-nine, in good health; mother, aged forty-three, in good health; six other healthy children. Mother has never had any abortions. Family history as to tuberculosis, cancer, syphilis, epilepsy, negative. Mother an alcoholic and father a "drinking man."

Previous Personal History.—Birth normal, breast-fed. According to the mother's statement (she was drunk when interviewed) the boy has never had any of the diseases incident to childhood. He began school one year ago and made good progress during the term.

Present Illness.—About October 1st it was observed that he did not feel well and sat about most of the time, although previously he had been a very active boy. He ate very little, was constipated and had no fever.

EXAMINATION OF VARIOUS SYSTEMS.

Find fairly well nourished colored boy lying in bed in stuporous condition; can be aroused, but with difficulty. Does not answer questions well and if not disturbed falls asleep immediately.

Cutaneous System.—Skin warm and dry; the right leg is colder than the left, no difference in temperature in the upper extremities. There is a small scar on the forehead, no eruptions on the skin noticeable. The temperature normal with slight elevations above normal. Glands are not enlarged.

Digestive System.—Breath very offensive; teeth in poor condition; the tongue slightly coated; is constipated and passes yellow, greenish stools. The abdomen is apparently normal, some flatulence and distention present; spleen and liver normal size. Patient does not vomit.

Respiratory System.—Nose flattened; alae nasi dilated, no dyspnea. Breathing regular. A few moist râles in the supra- and infraclavicular regions; does not cough.

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* Presented before the Annual Meeting of the American Pediatric Society, Washington, D. C., May 5-7, 1913.

Circulatory System.—Normal, the pulse is weak and regular. Pulse 78 to the minute. Blood examination:

Hemoglobin	100 per cent.
Leukocyte count	10,300
Red cell count	6,500,000
Wassermann	++

Osseous System.—Normal.

Nervous System.—Mentality: Patient is dull and apathetic, but at times is quite rational. Reflexes: Knee reflex absent on the right side, on the left slightly obtainable. Babinski's sign absent. Ankle clonus not obtainable. Ulnar reflex absent. Muscle tone: Both lower extremities are weak; they are not paralyzed, because when asked patient could flex and extend both legs; he could not flex the feet. Patient is unable to walk and unable to stand unsupported. About two weeks ago patient could walk with the aid of a stick (according to his statement). Muscles of the lower extremities are slightly rigid, wasting is not noticed. Arms are in normal condition, the strength is about the same in both. Muscles of the neck are rigid, and the head turns to the right side (torticollis).

Vision.—Ptosis marked. Pupils widely dilated, do not respond to artificial light, but he can tell light from darkness. *Ophthalmoscopic examination by Dr. Shute.* Left eye shows marked optic neuritis, amounting almost to choked disc. Right eye shows opacities, on account of which the fundus cannot be seen.

Audition is normal.

Hyperesthesia is marked in some portions of the lower extremities. Anesthetic points over the upper extremities and the trunk are detected.

EXAMINATION OF CEREBROSPINAL FLUID.

35 c.c. clear, watery fluid submitted.

Protein (Ammon. sulphite method): Not increased.

Cell count: 5.

Sugar: Negative.

Cytology.—Few small mononuclear cells. Few erythrocytes. (Traumatism of puncture?)

Bacteriological.—No microörganisms found, which includes examination for tubercle bacilli.

W. W. WILKINSON, *Pathologist.*

No history of convulsions. Kernig's sign present.

Genito-urinary System.—Patient has incontinence of urine. Urinalysis showed urine to be normal.

The boy lay in a condition of stupor for four months with very little change except on one occasion when he was found to be a diphtheria carrier in company with several other patients, a physician and three nurses. He died March 8, 1913.

Treatment.—The treatment consisted in supportive measures, salvarsan, mercury and iodids, and the antitoxin of diphtheria, none of which had any perceptible beneficial effect.

AUTOPSY PERFORMED BY DR. RANDOLPH.

Great emaciation of body and contracture of all of the skeletal muscles of the extremities. There are two large sores on each buttock. There is also a large abscess in the right side of head reaching down to the bone, through the periosteum. Heart and lungs normal. The intestinal glands are infiltrated with what appears to be tuberculosis. There is a large tuberculous mass in the mesentery. The brain shows an increase of fluid in the ventricles and in the subdural space. There is a large thrombus in the dural vein. The left lobe of the cerebellum is adherent to the base of the skull. The normal tissue has been destroyed by an inflammatory process, syphilitic or tubercular, most likely tubercular.

ANATOMIC DIAGNOSIS.

Tuberculosis (solitary) left lobe cerebellum.
Edema pia.
Old pleural adhesions.
Tuberculous mesenteric glands.

B. M. RANDOLPH.

The tissues from Benj. Gordon, No. 12,819, Children's Hospital, have been examined with the following result:—

1920, cerebellum tumor, tuberculous mass.

1921, cerebrum, fungoid mass on ant. lobe, pia-arachnoid thickened, fibrous and calcareous.

1922, mesenteric lymph nodes, extensive tuberculous mass.

F. F. RUSSELL.

THE CAUSE AND PREVENTION OF ADENOID GROWTHS IN CHILDREN.*

BY H. E. JORDAN, M.D.,

Professor of Histology and Embryology in the Medical School of the University of Virginia; and Chairman of the Eugenics Section of the American Association for the Study and Prevention of Infant Mortality.

There is a widespread popular notion that pharyngeal surgery in children is today carried to extremes. The layman often asks the physician, "Why do my children need to have their adenoids and tonsils removed when neither of their parents or grandparents ever suffered inconvenience from this source?" or, "Why are humans endowed with tonsils and pharyngeal lymphoid masses if they simply mediate baneful consequences?"

I have long felt that these queries were thoroughly reasonable and amply justified. It has seemed to me that the physician and surgeon have largely interchanged cause and effect in this connection. Is it not quite possible that instead of hypertrophied faucial and enlarged nasopharyngeal tonsils being the direct cause of the concomitant morbid symptoms, some more fundamental, but readily controllable, factor stimulates to hypertrophy and induces the obstruction and resulting disorders?

The mouth is the gateway to the digestive system. The immediately adjacent pharynx is very richly supplied with lymphoid tissue, both diffuse and aggregated in three paired and one unpaired (lingual) masses. Surely there must be some teleologic reason for this extraordinary accumulation of adenoid tissue at this point. The function of lymphoid tissue everywhere is to hold in check and render harmless bacteria and other noxious products through the operation of the phagocytic lymphocytes which it produces. To adequately meet hostile agents at the very entrance to the system which gives easiest access to the more vital organs would seem to be the purpose of this extensive fortress of lymphoid tissue. Increased functional demand upon a tissue ordinarily results in proliferation or enlargement of its elements, resulting in enlargement of the structure. Proximately, then, the hypertrophy of the several tonsils would seem to be caused by an increased physiologic demand. What is the factor or chain of factors involved?

Young children are almost chronic sufferers from nasal colds. This prevents use of the nose in breathing. The habit of mouth-breathing is thus formed. The nose, of course, is the normal terminal organ of respiration. It serves to filter the air in a measure by reason of the nasal hair and mucus, thus ridding it of many of its grosser mechanical and bacterial impurities. When this extra work is thrown upon the mouth and pharynx naturally enough the augmented functional demand is met by tonsillar and adenoid hypertrophy. Moreover, inability to successfully cope with the injurious elements results in diseased tonsils. It would seem, then, that the solution of our difficulty of too extensive tonsillectomy and other pharyngeal surgery in children is a matter of promoting nose-breathing, which, in turn, is largely a matter of preventing colds.

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* Presented before the Annual Meeting of the A. A. S. P. I. M., Cleveland, 1912.

But how can colds be prevented? What is the ultimate factor involved? It is chiefly and primarily, I am convinced, the almost universal immediate inattention to damp linen. Infants and young children (*i.e.,* from about one to two years) are frequently allowed to go "wet" for hours, especially at night. No adult could endure such condition without nasal cold or worse. Indeed, with the best of care it is almost impossible to keep young children "dry" at night, or even covered and thus protected against evaporation and chill. In winter time the risk is especially great. And how rarely is serious attempt made to give children the ideal care here postulated!

It seems clear that, to prevent the first link in the chain of causation leading to pharyngeal troubles, frequently calling for surgical intervention, some satisfactory plan or device must be instituted for keeping infants dry. The series of links are damp clothes, exposure, with evaporation and possibly chill; nasal cold, with obstruction of nostrils; mouth-breathing, hypertrophy and frequently disease of lymphoid tissue of pharynx, operation, and loss of an obviously essential bulwark against deleterious elements seeking entrance to the digestive tube.

The solution would seem to be relatively simple. May we not hope that the modest matter of keeping infants dry may sufficiently appeal to pediatrists generally to move them to use their ingenuity in devising some hygienically and economically satisfactory means of circumventing damp linen on infants, in view of the present suffering of the innocents from tonsillectomy and adenoid surgery, and the resulting loss of a mechanism essential for full-toned speech and proper safeguard against oral infection? Short of the ideal condition of complete absence of damp linen, much would be gained for the health and comfort of infants and children if pediatrists more generally emphasized to mothers the importance of dry linen as a protection against colds, and of nose-breathing as a means of obviating adenoid growth.

SOCIETY REPORTS.

THE PHILADELPHIA PEDIATRIC SOCIETY.

March 18, 1913.

THEODORE LE BOUTILLIER, M.D., PRESIDENT.

SYMPOSIUM UPON THE NERVOUS DISORDERS OF CHILDHOOD.

THE NEUROSES OF CHILDHOOD.

DR. CHARLES W. BURR read this paper. (See p. 416.)

DR. J. P. CROZER GRIFFITH said that a neurosis was a functional disturbance of the nervous system not dependent upon any structural lesion. This gave the neuroses a very wide range. Many doubtless depended upon actual organic changes not known to us. Many others were strictly functional, though sometimes the resut of organic change outside of the nervous system. Dr. Burr is undoubtedly correct in saying that at least many of the neuroses begin in infancy; there must be some reason why some children develop them and others do not. The intensity of the exciting cause may possibly be greater in one case than in another. Dr. Griffith would not feel prepared to believe that all neuroses must depend upon a congenital tendency and were impressed upon the child for all of its life. Many neuroses are manifested by a spasmodic condition of the body. Among these may be mentioned convulsions, some forms of chorea, tetany, head-nodding, head banging, laryngismus stridulus. Others have no spasmodic condition, as many forms of headache and night-terrors. Other neuroses might be called visceral, occupying an interesting position among the diseases of early life. Enuresis is a typical common one; closely allied to it is the nervous incontinence of feces. Anorexia nervosa may exhibit itself in infancy as well as in later life. Dr. Griffith recorded the history of a child of fourteen months where gavage was necessary for months before the child could be induced to take food. Many forms of vomiting in infancy and early childhood are distinctly neuroses. Recurrent vomiting is probably a neurosis depending upon a toxic state of the system. Here, too, come those curious cases of children who can vomit practically at will and infants in whom even smiling may produce vomiting. The psychoses and neuroses are very closely related. Some of these we pediatrists would call manifestations of hysteria, which is not uncommon at this time of life. These conditions are made worse by free conversation on the part of the parents regarding the matter in the presence of the child. Dr. Griffith always insists that the symptoms be described to him in the absence of the child and as little mention as possible be made of them at any time. In the matter of the importance and influence of school life, Dr. Griffith is somewhat at variance with the speaker. Many children are mentally overdriven and confinement in school has a bad effect.

Dr. D. J. Milton Miller, of Atlantic City, N. J., agreed with Dr. Burr about the over-care of children; this age might well be called the apotheosis of childhood. But it is not underwork, but overwork, that children get in schools; they are overeducated; the amount of work they have to do causes neuroses. While all children have not the same capacity, they are all treated as if they had. The afternoon session takes up the time which the child ought to spend out of doors. Dr. Miller has also noticed neurasthenia, true nervous exhaustion, neuroses, vomiting, pylorospasm, extreme timidity and nervousness in infants. Such babies are apt to remain neurotic all their lives. They are usually marantic and the struggle for existence and the over-care they demand undermines their nervous stability. He referred to a baby of three years which only weighs 10 pounds. If this child heard anyone speak of how badly she looked or any other depressing thing she usually vomited the next meal.

THE CHOREAS OF CHILDHOOD.

Dr. T. H. Weisenburg read this paper, by invitation. (See p. 424.)

Dr. E. E. Graham discussed this paper from the standpoint of the pediatrist. Sydenham's chorea gives the impression of an acute infectious disease, the infection affecting the nervous system. It is common between five and fifteen years, and is much more often seen in girls than in boys, and is very rare in colored children. It is most common in spring, probably due to the child's run-down condition at that time of the year. It occurs in excitable, nervous children, with an inherited weakness of the nervous system, epilepsy, insanity or inebriety in one or both parents. About 25 per cent. of cases give a history of rheumatism and about 25 per cent. have heart disease. The mortality from chorea is said to be about 2 per cent. Dr. Graham has seen one fatal case, a girl aged eight years, in her third attack of chorea, with acute endocarditis. Any acute infectious disease may be the cause of chorea, this predisposition being more marked if the child be neurotic. Dr. Graham considers worms, adenoids, phimosis and eye-strain predisposing, but not actual causes of chorea. Certain vascular and perivascular changes have been noted, leading to the embolic theory of chorea. But as endocarditis occurs in 25 per cent. of cases, emboli might naturally be found occasionally. Bacteriologic study has shown a diplococcus, streptococcus and a staphylococcus as possible causes. The movements of chorea do not always cease during sleep. In severe cases the movements may even awaken the child. These children should be taken from school and given a modified rest cure; complete isolation is rarely necessary. A large room with sunshine and fresh air should be procured and the child made happy and at the same time secure a maximum amount of rest. Fowler's solution in full doses is of value. Electricity does more harm than good. Sedatives are of benefit and Dr. Graham gives moderate doses of salicylates in all cases. Suggestion may do good in the more severe cases. Habit chorea can readily be diagnosed from chorea if one remembers that the movements are limited to a single muscle or group of muscles, and that the face is more often affected than any other part of the body. For the child with habit-spasm a routine existence and the development of self-control are important.

Dr. Miller referred to a case in a child of two and one-half years, one of the youngest on record. This child had tonsillitis, cervical adenitis with suppuration and chorea, following the paroxysms of fear into which the child was thrown whenever its neck was dressed. This chorea lasted eighteen months. Although the tonsillitis may have been the predisposing cause here, undoubtedly fright and shock were the exciting causes.

Dr. H. K. Hill referred to several cases of chorea which he had seen in Professor Monti's clinic in Vienna. Monti suggested that endocarditis might be the cause of both rheumatism and chorea. Dr. Hill has used acetyl-salicylic acid exclusively for three years for chorea with good results, insisting on cessation of school and rest in bed.

Dr. J. F. Sinclair spoke of having employed fluid extract of ergot in the treatment of chorea. One child who had not done well upon arsenic or aspirin, but who had already gotten well upon ergot, was again cured during a recurrence of the chorea upon ergot.

Dr. Weisenburg added that he did not consider the movements of the choreas of childhood similar to those of the choreas of adults, notably Huntington's type. For some years he has had moving pictures of infectious chorea and hysterical chorea and repeated studies by this means have impressed upon him the marked difference in the two, which anyone seeing them under such auspices could instantly detect. There is, however, a definite resemblance between the movements of Huntington's chorea and generalized tic. In his experience most cases of fatal chorea occur in young adults and deaths in young persons are extremely rare.

EPILEPSY IN CHILDHOOD.

Dr. J. Hendrie Lloyd read this paper, by invitation. (See p. 432.)

Dr. W. S. Cornell asked Dr. Lloyd's opinion of the nature of the display of violent temper frequently seen in juvenile delinquents. It was his opinion that these represented principally the lack of emotional control which usually accompanies a poor intellectual development rather than psychic epilepsy. In his work at the House of Detention he has seen a considerable number of feeble-minded children and a larger number of constitutional inferiors or border-line cases of feeble-mindedness, but only comparatively few who were neurotic according to his idea of such a condition, namely, primarily neurotic. On the other hand, Dr. W. J. Ely, of the Juvenile Psychopathic Institute of Chicago, reports that he has found some 6 per cent. of juvenile delinquents to be epileptic. In the House of Detention here an effort has been made to find any nocturnal epileptics by inquiring as to bed-wetting and soiling the pillows with blood from biting the tongue, but without results. It is important in this connection that the question of the proportion of epileptics be determined, since the condition affects the responsibility of the patient.

Dr. R. H. Spangler said that he felt keenly the injustice done to the medical profession of Philadelphia, as well as to himself, by the newspaper reports on the use of crotalin. He could not be held responsible for distorted abstracts of his scientific writings by the lay press. Crotalin is not advocated as a panacea for all cases of epilepsy. His last report was published in the *New York Medical Journal* of March 22, 1913. He referred all interested to this article as embodying the results of his experience up to the present time with crotalin. The results obtained in cases of "petit mal" have not been as encouraging as in cases of frequently recurring attacks of "grand mal." His researches show that the venom, if used with care and in small doses, lengthens the clotting time of the blood. He saw the child, to whom Dr. McKee referred, the night it died. The venom used had been dissolved in normal salt solution and was not prepared with an antiseptic preservative such as Dr. Spangler uses. There was every evidence of an aerobic bacillus infection. It was also true that an unduly large dose was given for a child. Dr. Spangler added, in regard to the point brought up by Dr. Robinson, that other substances which produced local irritation often caused a suspension of attacks of epilepsy, that numerous blood counts showed that no leukocytosis resulted from the crotalin injections, nor was there any systemic rise of temperature. He said that, as his reports of a number of cases showed, very satisfactory results had been obtained with crotalin.

Dr. Lloyd added that various pathologic conditions have been found in cases of epilepsy which come to autopsy, some of them probably of not much significance. Focal encephalitis is not cured by operation. Cysts and porencephalic conditions generally had been let alone. In his earlier experience Dr. Lloyd had once advised operation in a case of porencephalon, but the result was disastrous and the patient's brain is now in the Mutter Museum. Psychic equivalents, such as outbursts of anger, are rare in children. Dr. Lloyd has felt an interest in the crotalin treatment; but any new preparation like this should be standardized and control observations made by others before its real value can definitely be ascertained. Dr. Lloyd understands that such work is now being undertaken.

CURRENT LITERATURE.

ABSTRACTS IN THIS NUMBER BY

DR. CHARLES E. FARR. DR. JEROME S. LEOPOLD.
DR. C. D. MARTINETTI. DR. ALFRED F. HESS.

SURGERY.

HAYNES, IRVING S.: CONGENITAL INTERNAL HYDROCEPHALUS. (*Annals of Surgery,* April, 1913.)

Haynes's article is very extensive and complete in every detail. The literature is very carefully reviewed and all of the various operations and procedures for the treatment of congenital internal hydrocephalus are thoroughly discussed. Haynes's operation consists in draining the cisterna magna at the base of the brain into the cranial sinuses by means of a small curved silver tube. Two cases were operated upon, one a male child of six months, on whom repeated lumbar puncture had been performed, but without any permanent improvement. In this case the cisterna magna was accidentally opened widely with the escape of a large amount of clear fluid. The incision was immediately sutured tightly to prevent sudden death. The child improved for three weeks and then relapsed, and at the time of the writing was in a hopeless condition. The second case was a female child of six months, upon whom the complete procedure was carried out, connection being made between the cisterna magna and an emissary vein. This child also improved for three days and then rapidly succumbed to the sudden loss of cerebrospinal fluid. Autopsy showed no blood in the cisterna magna and but little fluid. The cannula had been displaced from the dura and a clot had formed within it. Notwithstanding these two bad results, Haynes believes that his operation is based on sound reasoning and that its technic is neither too severe to the patient nor difficult for the operator. CHARLES E. FARR.

PINCHERLE, M.: RARE LINGUAL LESION IN INFANCY. (*Riv. di Clin. Ped.,* January, 1913.)

Three cases have been observed with approximately the same course. Hyperpyrexia was first noticed and reddening of buccal mucosa. The gums appeared swollen and spongy, bleeding very easily. On the upper surface of the tongue a small tumor the size of a pea was noticed, coated with a whitish stratum. Submaxillary glands were engorged. The duration of the disease is about four weeks, when all returns to normal. Microscopic examinations of the tumors revealed them to be teleangectasic granulomata of a benignant type.

C. D. MARTINETTI.

MEDICINE.

PIELSTICKER, F.: ARTIFICIAL PNEUMOTHORAX IN CHILDREN. (*Monats. f. Kinderhk.*, 1913, No. 4.)

Pielsticker uses the Forlanini method and the Brauer instrument. He injects from 100 to 150 c.c. of oxygen into the chest of the affected side and follows this with sufficient nitrogen to collapse the diseased lung. His youngest case was an infant fifteen months old which bore the collapse of the entire lung remarkably well. He has used the method in children of all ages suffering with pulmonary tuberculosis and also in bronchiectasis, the results being excellent in the former, but much less satisfactory in the latter. In most of them sufficient lung collapse could be attained without injury to the surrounding parts.

CHARLES E. FARR.

GÖTZKY, DR.: THE CLINICAL SIGNIFICANCE OF ENLARGEMENT OF THE CUBITAL GLANDS IN CHILDREN. (*Zeits. für Kinderhk.*, April 23, 1913, p. 113.)

Götzky has examined a large series of cases from Heubner's clinic in Berlin and has come to the following conclusions: Enlargement of the cubital glands is found in all ages of children. They are generally enlarged on both sides, and are then usually of luetic origin. The enlargement is at times due to tuberculosis, but very rarely to rachitis. In infancy enlargement of the cubital glands is almost pathognomonic of lues. In older children cubital glands are, at times, the only symptom of latent lues. Cubital glands are not associated with lymphatismus. One-sided enlargement of the cubital glands usually does not mean lues.

Götzby took a large number of X-ray pictures of the bones and is of the opinion that in this way a diagnosis of periostitis can very often be made.

JEROME S. LEOPOLD.

CONCETTI, L.: CONGENITAL MUSCULAR ATONY OF OPPENHEIM. (*Riv. di Clin. Ped.,* January, 1913.)

Concetti has studied very closely the case of a child aged fifty-three days that died after a week of illness in his clinic. A histologic examination revealed a condition already described by other writers, namely, an arrest in the development of the peripheric motor neurons, particularly in the cells of the anterior horn of the medulla. To this may be traced the retarded development of voluntary muscles and their defective contractility. Concetti found no traces of degenerative processes whatever which would explain the possibility of improvement in these cases. The retarded and arrested development was evident likewise in cerebellum and brain, but not in glands with internal secretion. C. D. MARTINETTI.

THERAPEUTICS.

V. BEHRING, E.: A NEW PROPHYLACTIC CURE FOR DIPHTHERIA. (*Deutsch. med. Woch.,* May 8, 1913, p. 873.)

In this paper, v. Behring launches a new diphtheria cure. He states that in spite of the diphtheria antitoxin the mortality from diphtheria runs into thousands. He now proposes to produce an active immunity instead of merely a passive one, by injecting a mixture of toxin and antitoxin. Treatment of this nature has been suggested by Theobald Smith, of this country. It has not, however, been put into practice, probably because of the fear that the toxins might be dangerous. The toxin-antitoxin mixture which Behring suggests is one in which the two elements are so combined that the mixture is no longer injurious to guinea pigs when injected subcutaneously. He reports having used this prophylactic measure in 80 cases, and having had no unfavorable results.

This new therapy will no doubt be at once tested both here and abroad. Its value will not be in cases of diphtheria, but as a prophylactic in institutions and schools and such places where epidemics occur. It remains to be seen whether a serum can be found of value, one which is able to cause active immunity by means of the toxin, but which does not occasionally produce toward symptoms, such as paralysis, in children who are especially susceptible. ALFRED F. HESS.

INFANT FEEDING.

RIETSCHEL, HANS: INANITION AND EXCRETION OF SUGAR IN INFANTS. (*Zeits. für Kinderhk.*, May 3, 1913, p. 282.)

Depriving infants of food for too long a period may cause death, as Czerny, Ibrahim, Rosenstern, Finkelstein, Meyer and others have shown. With this starvation there is often seen an excretion of sugar in the urine. After a period of starvation death may result from a toxemia if too much food is given at once. This fact has been demonstrated in adults and experimentally in animals.

Rietschel starved healthy breast-fed infants for two to three days and then gave them a large amount of milk to drink. In all of these cases the presence of milk sugar was demonstrated in the urine. On the other hand, if a small amount of milk was given no sugar appeared in the urine. From these observations Rietschel concludes that a period of starvation of several days in healthy breast-fed infants results in a disturbance of metabolism and diminishes the tolerance for sugars in these infants. Thus it is clear that a period of starvation which cures many cases of nutritional disturbances can also do harm in certain cases. JEROME S. LEOPOLD.

GRAVIDIC HYPERTENSION.—V. Wallich (*Ann. de Gyn. et D'Obst.*, November, 1912) says that hypertension is a syndrome that should be carefully studied in pregnancy. It seems to be related to a functional disturbance of the kidneys and autointoxication. This hypertension is signalized by headache, insomnia, edema and polyuria, and may be responsible for placental or visceral hemorrhage. The pulse tension of the pregnant woman should be carefully watched, with the sphygmonometer. When recognized, hypertension should be treated by rest in bed, diet, laxatives, and medicines which reduce hypertension. In acute cases we should resort to venesection with abundant and repeated bleedings. We should be prepared to foresee and prevent eclampsia, and these attacks of hypertension, which may kill either mother or child. High arterial tension may be regarded as the usual cause of placental hemorrhages, and of the visceral hemorrhages which occur in eclampsia and albuminuria. Nitrogen ingestion must be regulated and meats reduced to once a day.

BOOK REVIEWS.

SELECTED PAPERS OF DR. CARLOS J. FINLAY. Published by Government of the Republic of Cuba, 1912.

This is a volume of which anyone might be proud were this amount of work his, and particularly when the character of the work here revealed is so epoch-making and beneficial as is this of Dr. Finlay's.

A great many of the papers are in Spanish, but many are the contribution of Dr. Finlay to various American medical journals and in English.

It is a worthy act of the Cuban Government to bring again to the notice of medical men everywhere Finlay's part in the detection of the part the stegomyia plays in yellow fever infection. As far back as 1881 he published articles arguing for an intermediate host and for the probability that the intermediate host was the mosquito. Even going so far as to inoculate non-immunes by allowing mosquitoes which had fed upon yellow fever cases to bite them, he produced mild attacks of typical yellow fever *and subsequent immunity*. This was long before the Intervention and the work of Reed and Lazear, and while Finlay did not have the technique nor the knowledge nor the apparatus to carry out the research as the American commission finally did, yet the wonder is that with what was then known—or not known—he disclosed so much. Cubans may well be proud of so distinguished a fellow-countryman.

SCHOOL HYGIENE. By FLETCHER B. DRESSLAR, PH.D., Specialist in School Hygiene and School Sanitation, United States Bureau of Education. Pp. 369, illustrated. New York: The Macmillan Company, 1913. All rights reserved.

This is a most excellent book, written by one who rightly calls himself an expert in school hygiene and school sanitation. To the uninitiated it opens up the wide vista of school hygiene and proves a very entertaining, as well as very instructive, volume. For the teacher it gives practical pointed information upon her particular problem, and by a series of questions at the end of each chapter and a remarkably full bibliography, also at the end of each chapter, encourages research and the acquiring of a fuller knowledge than even this book can furnish. To the physician, the wholesomeness of Dr. Dresslar's comments, his appreciation of the necessity for the conservation of the school child's health and his lack of pedantic adherence to the established scholastic regimen is most refreshing.

BOOKS RECEIVED.

Narcotic Drug Diseases and Allied Ailments. By George E. Pettey, M.D., Memphis, Tenn. Pp. 516. Illustrated. Philadelphia: F. A. Davis Company, 1913.

How to Collect a Doctor Bill. By Frank P. Davis, M.D., Secretary Oklahoma State Board of Medical Examiners. Pp. 92. Newark, N. J.: Physician's Drug News Company, 1913.

Wayside Experiences. By C. Elton Blanchard, M.D. Pp. 246. Newark, N. J.: Physician's Drug News Company, 1913.

Diagnosis and Pathogenesis of Duodenal Ulcer in Infants.—Herman Flesch (*Jahrb. f. Kinderhk.*, 1912, Bd. XXVI., H. 5) says that duodenal and peptic ulcers have been considered very rare in infants. Out of 364 cases seen at the Kinderasyl at Budapest, 3 per cent., that is 11 cases, showed at the postmortem peptic ulcers, none of which were diagnosticated during life. These children were from six weeks to six months of age. Most of the ulcers were located in the upper part of the duodenum near the pylorus. This would indicate that duodenal ulcers are not rare. The author had a case in which the ulcer was diagnosed during life in a three-months-old child, who was extremely emaciated after an attack of acute indigestion and had signs of hydremia. The ulcer showed itself by the sudden appearance of bloody stools, with hypothermia, frequent and weak pulse, and signs of collapse. All attempts to relieve the heart weakness were without avail, anemia increased, and bloody stools and weakness ended the scene. As to the cause of such ulcerations previous disturbances of digestion play a large part, especially those of a vasomotor nature. Inanition and hunger cause disturbances of function of the mucous membrane and slight disturbances of circulation lessen the resistance to the action of the pepsin on the lining of the stomach.

ARCHIVES OF PEDIATRICS

JULY, 1913

ROYAL STORRS HAYNES, PH.B., M.D.,
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EDITORIAL.

THE SPIRIT OF BABY SAVING.

Last year Philadelphia held a "Baby Saving Show," which was a model of its kind and to those who were privileged to journey to see it, as a source of inspiration. Not alone to the tenement parent, nor even to the college-bred layman was it helpful, but to the nurse, to the physician and to the physicians who should know most of baby saving—the pediatrists—it brought new knowledge and indicated new ways for better work.

Now there comes a published *Report* of the Show, which for thoroughness and completeness is well night perfect. It is something which every reader of the ARCHIVES should procure, read, mark, learn and inwardly digest.*

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* Copies may be obtained from the Child Hygiene Association, Real Estate Trust Building, Philadelphia. Price, one dollar.

To this *Report* there is a "Foreword" so beautiful, so comprehensive, so full of a loving understanding of what life's beginning means to mother and to child. that we reproduce it here, hoping that Dr. Talcott Williams, whose great mind conceived it and whose accomplished pen wrote it, will realize our gratitude for his appreciation of the spirit of baby saving.

FOREWORD.

Knowledge is waste, unless knowledge saves. Humanity is the measure of scientific discovery. Unless the many learn, the few teach in vain.

The Philadelphia Baby Saving Show lived all this. It sought to bring the newest fact in medicine near the newest baby. It brought science to worship the babe in arms, and, most of all, the babe for whom "there was no room in the inn," the inn of all the world, in which the best rooms are taken by the old and advantaged, which are the past, and the babe, which is the future, is brought forth to pay the heavy tax of death, laid by a decree greater than Cæsar's, through which all the world is indeed at last taxed, but the babe first and most of all.

Not all babies. Even this tax of death laid on babies can be commuted by care and knowledge. The death of the old is inevitable and in the course of nature. The death of babies is social murder and in the course and carelessness of man. Educate the mother, and the baby will have life more abundantly. Given perfect conditions, or at least as perfect as our known knowledge now permits, and not one baby in an hundred would die, as a baby. Years later, age would end. Now, babyhood slays. Leave conditions as they are and twenty or twenty-five out of an hundred babies die.

The fight for babies is in most cities the fight for a quarter of those born. No one can win this fight but the mother. Add to her love, knowledge, and to her knowledge, instruction, and to instruction, practice, and a place in a mother's arms would be the safest of all refuges. Today society slays one in four babies in their mothers' arms. It is the most unsafe refuge known. No other part of society dies as much as babies.

The Baby Saving Show in Philadelphia was an effort, both beautiful and blest, to make a place in a mother's arms as safe as it looks—to make it the home of life as well as of love, and not, as it is now, the haunt and harvest of death. It was pathetic to discover that the mothers already knew this. They knew no statistics. They only knew babies and little white coffins. Try to think what it means—if you can bear the poignant pang of this discovery—to find out through this show that mothers by the ten thousand knew that their babies need not die, knew that somewhere there were men who knew what would save their babies, and yet knew no place where they could get this precious knowledge, this buckler and shield against the darts of death, aimed at the babies in their arms.

The instant the Philadelphia Baby Saving Show was opened it filled with mothers. Every day it filled over and over again. They came by companies, by regiments, by brigades and by divisions. No Philadelphia procession ever equaled the numbers in these throngs seeking knowledge how to keep their babies alive. It was given them. It was flung out in print. It was made plain in placards. Models made it still plainer. Safety was acted. Hundreds of young women, trained in this wondrous tale, told it in booth and alcove. The future mother, patiently waiting until she met her chance of one death in twenty in childbirth, came to hear lectures that she might save the child below her heart from one death in five births that lay in wait for it. Girls came with their dolls to learn how they could care later for their babies. Women about to be married came and learned the perils disease sows and sets in the path of careless love. Men learned how they slay mother and child in an ignorance deadlier than Herod's.

If one Baby Saving Show did this in one city, as is here set down, why not have a Baby Saving Show in every city, every year?

ORIGINAL COMMUNICATIONS.

A CLASSIFICATION OF THE SUMMER DIARRHEAS IN INFANCY.*

BY HENRY KOPLIK, M.D.,
New York.

The term "summer diarrhea" is really a purely seasonal nomenclature of the intestinal disturbances which I am to consider this evening. It is incorrect, inasmuch as diarrheas which are prevalent during the summer can be shown to exist during the rest of the year. It is only, therefore, because they are more frequent during a certain warm spell of the year, from the middle of July to the first of September, that among many English-speaking people the term summer diarrhea has become a by-word and has even been adopted in the literature of the subject.

The summer diarrheas are a set of intestinal disturbances varying from mild dyspepsia to the most fatal choleraic diarrheas, which are prevalent at all seasons, but more especially that mentioned above. They occur almost exclusively in the bottle-fed infant and leave the breast-fed infant practically immune. This paper will, therefore, consider for the most part the conditions met with in the artificially-fed infant.

The American Pediatric Society as far back as 1894 made an attempt to formulate a classification of diarrheal diseases of infancy, and among others the summer diarrheas so-called. This classification has not been generally adopted, and our views on this much discussed subject, even today, are a matter of varied discussion as well as classification. It may be said that the whole series of intestinal disturbances which show no pronounced lesions of the intestinal tract postmortem belong to the class of diseases which we are considering this evening. In this way the disturbances of the intestine, the cases of so-called ileocolitis dysenteriæ, are not considered. A classification, therefore, of the gastrointestinal disturbances prevalent during the summer months will vary, not as to the nature of the lesions to be found postmortem in the intestine alone. The classification of the various forms of summer diarrheas may be etiologic, such as we see reflected in the work of Escherich and his school, or it may be etiologic, as seen in the ideas of Czerny's school, or etiological and clinical, as elaborated by Heubner and his pupils, Finkelstein, Langstein, Bendix, L. Meyer and others, or we may speak of a mixed etiological and clinical classification, as reflected in the American and English literatures.

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* Read before the County Medical Society of New York, May 26, 1913.

A mere enumeration, as I have just made, shows that this whole subject of classification is in its formative period. A vast amount of pure theory is mingled with a few facts, and these remain until new facts will be uncovered from time to time to complete our actual knowledge of the diarrheas and intestinal disturbances of infancy.

No classification of a disease can be said to be complete until it rests upon the firm basis of pathologic and pathogenic knowledge. This cannot as yet be said of the summer diarrheas, therefore any form of classification today is temporary. These intestinal disturbances which we will consider are found with reservations among artificially-fed infants, and for this reason the first great step in their elucidation was taken by the Czerny school, which made a study of the food itself as an etiologic factor in the causation of the class of diarrheas we are considering and elaborated the theory of *food injuries* to the intestine. By food injury we understand a series of disturbances varying from the mildest form of dyspepsia to the severe toxic intestinal disturbances caused by a food, wholesome in itself, but given to the infant either in unsuitable quantities or in quality such as to disagree with the digestive processes of the infant, and from a food become an irritant foreign body. The analysis and classification from the point of gross food may be subdivided into the disturbances caused by the various constituent elements of the food. Thus the food (milk) will contain fat, carbohydrates and caseins and to these may be added carbohydrates other than sugars, such as the cereals or flours, and these are shown to cause in certain phases a set of disturbances in the intestine which are of serious moment. The above also includes the proper or improper dilution of the food. Thus a concentrated mixture of wholesome fats, carbohydrates, or cereal may cause a most dangerous weapon against the well-being of the infant.

The first element of a disturbing food will be the fats, if present in an unsuitable quantity. At first the disturbances caused by this element of food in the artificially-fed infant may be slight, such as dyspeptic regurgitation, sour eructation, finally merging into colicy disturbance, and then diarrhea, or constipation and then diarrhea, and finally severe toxemia. All this in the presence of a fat percentage which may be wholesome to another child, and also, what must be impressed on the student, there may be no suspicion of infection or decomposition of the food. Such cases we see quite frequently, not only in summer, but at all seasons, but in the summer they are more frequent than at any other season of the year.

Another set of cases are those in which the carbohydrates of the food have caused an intestinal disturbance. The sugars are fixed upon as irritants in certain forms of intestinal fermentation. The sugar derived from the cow's milk itself is irritant. To this we will return later.

Finally the carbohydrates in the form of cereal added to the food may be in a certain series of cases the etiologic factor in the causation, first of dyspeptic disturbances, such as pronounced acidity, flatulence, loss or stationary weight, constipation and, finally, diarrhea and vomiting with progressive emaciation.

Whereas the casein of the food (milk) cannot be said to be in itself a source of disturbance in the intestine, the Czerny school has endeavored to change the form of its exhibition to the infant so as to facilitate its assimilation. Thus though they agree that casein in itself has not been responsible for any intestinal disturbances of infancy, its form of exhibition, its dilution, or the addition to it of other substances as seen in the malt-soup mixture aids not only in its assimilation, but reduces the energy expended in the gut while it is being transformed for the purposes of the economy. It will thus be seen that to the thoughtful this idea of a food irritant is nothing new. Rotch, when he was perfecting his percentage feeding, insisted that while one infant might thrive on a wholesome food of certain percentages of fat, casein and sugar, another might be poisoned by the same food. On the other hand, the old idea that the casein must be present in a proportion not much above that of human breast milk (Meiggs' Biedert) has been given a more liberal interpretation today and much larger amounts of casein are admittedly well borne (Finkelstein, Meyer and others), but it has been shown recently (Holt) that a too high percentage of proteids (casein) are not well borne and give rise to an alimentary fever much like that described by Vaughan when proteins are injected in concentrated form into animals.

Elaborating upon the Czerny food injury to the intestine, Heubner and his assistants (Finkelstein, Langstein and Meyer) have endeavored to show the way in which food acts as an irritant to the intestine, and though few new facts are contained in these later day theories an attempt is made at a purely clinical classification of the summer or functional diarrheas based upon the various elements of the basic food (milk) as an irritant when introduced in some unsuitable way into the intestine. Heubner has endeavored to show that in introducing unsuitable food elements into the stomach and intestine the processes of acid formation and lab excretion in the stomach are disturbed, the energy expended in elaborating the food for absorption is abnormal, there is at first a waste of energy, then a disturbance of metabolic processes due to the presence of a foreign body in the form of unsuitable food, and, finally, forms of mild dyspeptic phenomena, a series of symptoms, the fermentative formation of gases and increase of abnormal secretions in the gut amounting to diarrhea and final catastrophe.

Finkelstein has gone a step further and has tried to evolve a classification of sets of cases in which the injuries due to various elements of the food could be traced clinically. He has divided his cases of diarrheas into those which begin in a series of symptoms of the mildest forms of stomach and intestinal dyspepsia, stationary weight, dyspeptic symptoms, then the symptoms of decomposition, and, finally, severe intoxication. He has tried to divide his cases into those which show merely the dyspeptic symptoms, such as mild fever, flatulence, increased colic and intestinal diarrhea, those which go further and show signs which are familiar to all, as intestinal decomposition, toxemia, fevers, uneasiness, restlessness, sleeplessness, pain, symptoms of involvement of the kidneys and other organs, as well as diarrhea, and, finally, the cases in which there is a condition of complete decomposition of the food in the intestine as shown by intoxication, fever, exhaustion and collapse, with diarrhea, uremia and final catastrophe. He has to his own satisfaction found that the food elements are the cause of these disturbances. Take away the food and there is an immediate subsidence of the symptoms. Thus he lays much stress on the fats and sugars as a cause of an infinite variety of trouble, and in this he insists that the casein has never, to his observation, been a source of trouble to the infant. While not denying to the older theories of bacterial influence their importance, he thinks that their rôle has been much over-estimated and a classification on the ground of the introduction into the body of bacterial elements as a causation of diarrhea has obscured the main cause of all our trouble, *the food* itself.

Thus following the teachings of Heubner, Finkelstein classifies his intestinal diarrheas and disturbances into, first, the cases which fail to show an increase of weight, and in whom any increase in the food will give rise to diminished weight.

Then next come the class of dyspepsias in which the intolerance of various food elements is shown in fever, diarrhea and diminution in weight. Then there are the cases which have passed into a state of atrophy with what is called decomposition of the food elements in the intestine, and, finally, these cases may merge into the cases with decomposition and severe types of intestinal toxemia or intoxication. As causative factors fats and, especially, the sugars are fixed upon as dangerous in the extreme. It will thus be seen that old ideas have been elaborated in these theories and clinical observations. The idea that the sugars of cow's milk are irritant dates far back into the history of the study of infant diarrheas. One must go back to the teachings of Jacobi and Biedert to find these theories again revived. The fats as irritants is also a well-fought battleground, as can be seen by the work of Biedert in his work on the fat diarrheas. These old facts, clinical and physiological, have simply been revived and put in new surroundings modern clinical and physiological data. Even the question of the substitution of a malt sugar for milk sugar is quite old and must date back to the work of Escherich, Heubner, Soxhlet, Rubner, and today we have no pure malt sugar to give the nursling in spite of the many repeated assertions of its ready assimilability.

It is well now to inquire the fate of the infectious theories of the summer diarrheas. These began to absorb the minds of pediatrists at the time of the dawn of bacteriologic studies and discoveries. From the time of the work of Koch, Gaffky and

Flügge the bacteriologic classification of summer diarrheas held the scientific mind just as today the whole classification of "food injuries" has carried away the pediatrists. The great defender of the bacteriological infectious theory of the summer diarrheas was Escherich. Since the first sterilizer invented for infant's milk was placed in the hands of the profession by Soxhlet the whole army of pediatric students expended energy upon the bacterial classification of diarrheas both in winter and summer. For a time this attractive field monopolized attention. Escherich divided the diarrheas of infancy into those due to external sources of infection, bacteria introduced into the food from without, and those due to bacteria in the infantile gut itself, which he thought had changed virulence under certain favorable conditions and given rise to diarrhea and all the symptoms of infection. The colon bacillus could change its form and virulence and become dangerous to the infant host from without. Staphylococci and streptococci, bacilli, which held the gram stain (Tissier), all played a rôle. I need not recall the streptococcus diarrhea of Booker, Escherich and his pupils; the pyocyaneus diarrhea, the diarrhea due to proteolytic bacteria, the green bacillus, the bacillus of blue milk, the spores of late sweet fermentation of milk, the toxins generated in milk (Vaughan's tyrotoxicon), the bitter sporulating milk bacteria—all these gave rise to infections of various nature. But the proof of their universal influence in causing diarrhea was lacking. It is true that the sterilization of the infant's food has reduced the bacterial influences in the causation of diarrhea, especially in summer, but then whereas in European institutions the sterilization of the milk and the model dairy was even carried out to a painful detail, diarrheas (Flügge) continued, and it soon became evident that no general conclusions or classifications could be made upon a bacterial basis alone. Why? Because in institutions having flawless milk all the intestinal diarrheas described would appear in spite of the fact that a practically sterile food was placed in the infant stomach and intestine. Hence though even to-day we recognize the rôle of the bacteria, and although certain forms of diarrhea are directly traceable to infected food, we cannot accept this as the only etiological factor in a classification of summer diarrhea. Rotch of Boston, Flügge, Heubner and his school, Czerny were quick to recognize this, and hence we have the elaboration of the theories I have just described and a relegation to the second place of the bacteria in their rôle as a factor in the causation and classification of summer diarrhea. The classification and term summer diarrhea I have pointed out finds its excuse in the fact alone that during the summer months these diarrheas in artificially-fed infants are especially prevalent. Why? Is it the intense heat? If so, why is it the heat can scarcely be said to affect the breast-fed infant to any extent? Why should the artificially-fed infant alone suffer? Many theories are offered and many rejected. A large quota of infants, not all, undoubtedly suffer from careless handling of the food at this season, and here is the point where undoubtedly the infectious nature of some of the food offered to the infant must be made responsible for a certain percentage of cases of diarrhea. Decomposed food is dangerous, and it will not answer the argument to say sour milk is used in some countries to overcome diarrhea or to feed infants in summer: such sour milk is clean sour milk, not filthy, toxic, sour, fermented milk which is sometimes exhibited to infants; and yet, though a certain percentage of infants indubitably fall victims to such fermented, toxic diarrheas, we cannot say all bottle-fed infants who contract diarrhea in summer have partaken of filthy, toxic milk, for diarrhea occurs where the milk is and has been flawless. It must be that the bottle-fed infant has a resistance and vitality much below that of the breast-fed infant. This is reflected in imperfect assimilation of food not properly diluted and prepared; added to this the enervating effect of heat and humidity, the difficulties of assimilation in view of the depression of the circulatory and nerve functions is increased, hence the action of the food as a species of irritant in the gut. Heat alone will not cause disturbance, as evidenced by the fact that in the premature we must increase the heat of the body by external artificial means before we can attain results, but in the under-nourished or atrophic infants the combination of heat and humidity completes the enervating chain of influences. These reacting on the circulation and the general nervous system must reduce not only the working energy of the intestine, but also reduce general vitality and resistance. There is also some unknown and unexplained connection between evaporation from the surface of the body and body energy and the capacity for assimilation. This explains why in the cooler months infants can assimilate stronger food with a larger proportion of fat and other elements than offered them in the summer months. The laity even recognize these facts.

In passing in review the different etiological factors which enable us to classify diarrhea in infancy, I have not committed myself to any pet set of theories, because I feel that in the next ten years theories which hold the minds of students today must give way to more definite data when our clinical, physiological and pathological methods have undergone a refinement and perfection to-day unknown.

30 East 62d Street.

CHLOROTIC TYPE OF ANEMIA IN CHILDREN.—Mathilde de Biehler (*Arch. de Méd. des Enf.,* March, 1913) defines the chlorotic type of anemia in infants as a state in which there are pallor, digestive, circulatory, and nervous symptoms and a marked loss of hemoglobin, with a normal number of red cells. Cure is rapid after appropriate treatment is undertaken. The pallor is that of old wax, and the mucosa is pale, with a moderately fleshy condition. The internal organs are normal; there are anemic murmurs in the heart and vessels of the neck. The appetite is capricious, constipation is the rule, there are rarely vomiting and diarrhea. The child is apathetic, quiet, has enlarged glands and sleeps poorly. This condition results when only milk is used, or when it is continued too long. Predisposing factors are heredity, anemia of the mother, overwork by the mother, bad hygienic conditions, and poor food. Premature birth, twin births, icterus of the newborn, umbilical and intestinal hemorrhages and digestive troubles are active causes of this form of anemia. There is a diminution of the iron reserve of the system. Marfan distinguishes two forms of anemia: the pure and the mixed. The simple form is due to congenital insufficiency, twin labor and prolonged use of milk. In the mixed form are added the factors of digestive troubles, rickets or infectious diseases. The treatment is improved diet and iron administered in large doses. Very soon there are a better color, more physical activity, and increased appetite, and final recovery is the general result. The blood examination of 62 children was the basis of this paper.

CARE OF DEPENDENT INFANTS IN BALTIMORE.

An Investigation of 519 Infants Observed from the Age of Two Weeks, 365 of Whom Were Followed Throughout Their First Year.

BY J. H. M. KNOX, JR., M.D.,
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AND

HENRIETTA M. THOMAS, M.D.,
Dispensary Physician, the Babies' Milk Fund Association.

That sickness and death are more common in infancy than in any later period of life has been known for many years. It has been recognized only in comparatively recent times that a large part of this destruction of life at its threshold is due to preventable causes, to the denial to the baby of its fundamental rights to be well-born and properly fed and cared for. The present study was undertaken with the view of determining the actual conditions which surround the babies of the "dependent classes" of Baltimore, those who seek aid from a free clinic, and to ascertain also whether even a moderate amount of instruction and improved diet would not reduce the suffering and death so prevalent in earliest infancy. The work was conducted under the auspices of the Maryland Association for Study and Prevention of Infant Mortality (The Babies' Milk Fund Association). We were fortunate in securing the active coöperation of the obstetrical clinic of the Johns Hopkins Hospital, under the direction of Dr. J. Whitridge Williams. A list of all the babies delivered either in the wards or by the out-patient department from October 1, 1910, to October 1, 1911, was turned over to us each week. Every baby was visited by one of us, Dr. Thomas, between its second and third week, when it was examined and weighed and the mother advised as to its care and feeding. The following week it was again visited, usually by a trained nurse or a social worker, and afterward it was seen by a physician or nurse each month until it was a year old. Each family was also studied with reference to its social condition, and whenever advisable the suitable outside agency was asked to assist.

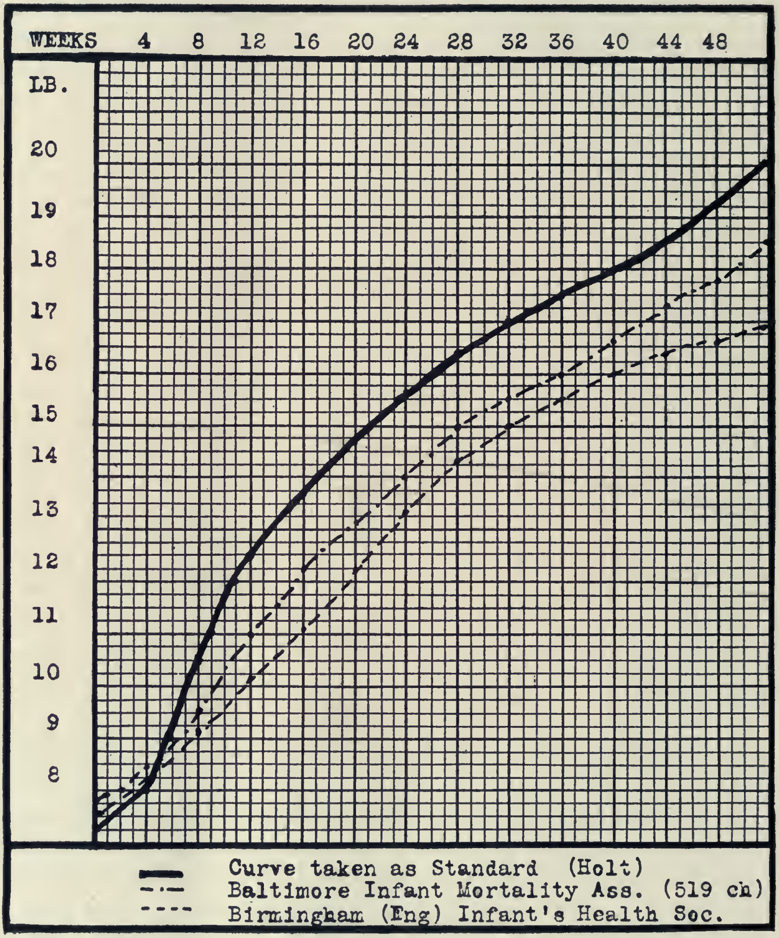
In the year specified we visited 519 babies; of these, 365 were carried through their first year, 41 left the city, 52 moved and could not be located, 6 were placed out with their mothers, 1 was discontinued, 2 were placed by their mothers in institutions, and 52 died, giving us a mortality rate of about 100 to 1,000, or 10 per cent. Of these 519 babies 240 were white, 279 were black, 454 were legitimate and 65 illegitimate.

During the same period in the city at large there were 2,064 deaths under one year; 436 of these occurred in the first fortnight, leaving 1,628 between two weeks and twelve months of age. The number of infant births in Baltimore can only be roughly surmised in the same period as the registration of births until the present has been notoriously deficient. The birthrate each year is variously estimated from 13,000 to 17,000; it is probably less than 15,000, hence the death rate for all babies from two weeks to one year, of the city, during the specified year, was about 108 per 1,000. These figures, of course, include all the children of well-to-do parents, and would indicate that such supervision as we were able to give to the babies of the poor reduced their mortality rate below that of the city at large.

A fairer comparison may perhaps be made with the colored infants, as a large majority of these were born to families attending the free dispensaries. The colored population in Baltimore is about 86,000; the colored births in one year were 2,300; the colored deaths between two weeks and one year 436, or about 200 per 1,000. At the same time in our series there were 279 colored births and 38 deaths between two weeks and one year, a mortality rate of 136 per 1,000. If this rate could have obtained throughout the city there would have occurred among our colored population alone more than 150 fewer infant deaths. It is evident, therefore, that even with the small amount of supervision furnished by a monthly visit of doctor or nurse, the large mortality obtaining among the children of poorer families of the city has been considerably reduced. This diminution in the death rate could be made more striking if it were possible to secure more thorough supervision through a larger corps of physicians and nurses.

Passing now from general results of the two years' work, a more detailed study of the babies followed for the twelve months furnishes many instructive facts.

Table I.



Average weight of babies from birth to one year old (by months).

The average weights of the infants in our series are compared with the standard weights curve as given by Holt and with the average weights for dependent infants of Birmingham, England, where work very similar to ours is being carried on. The birth-weight in our series is somewhat higher than the average, but this may not be accurate, as the figures were largely obtained from the mothers' testimony. The weight at four weeks, however, was taken by us, and since it also is nearly half a pound above our standard we must assume that our group as a whole weighed rather more at birth than the standard.

From the fifth and sixth week our average falls below the standard and the weight remains about ¾ to 1½ pounds lower throughout the first year. This is due probably to the lack of regularity in diet, to the work of the mothers, and to comparatively insufficient care. Failure to gain more rapidly in the later half of the year is also partly attributable to the diminution of the mother's milk. When this begins to fail often the baby is given solid food, frequently also tea or beer, almost never milk, and but little effort is made by suitable diet to increase the breast milk. The mothers in this series were encouraged to give the baby 1 pint of milk daily until two years of age.

It is interesting to note that of the 365 babies observed for twelve months 268, or 78 per cent., were breast-fed for at least nine months. This normal function is not diminishing, as was formerly thought. The great majority of mothers can nurse their children if encouraged to do so. The reasons for not nursing the baby throughout the nine months were obtained in 102 instances and were as follows:—

Mother in poor health	10
Mother pregnant	7
Sore nipples and gathered breast	6
Worked out or boarded baby	33
Did not want to nurse baby	3
Milk became scanty and breast dried up	30
Twins	9
Baby made sick by breast milk	4
	102

Examination of the reasons suggests that with a little help and supervision probably about 75 per cent. of these mothers could be enabled to nurse their babies at least throughout the first six months.

The weight of the baby at the end of twelve months, its general condition and the nature of the feeding is roughly indicated in the following table:—

TABLE II.

Weight of Baby at One Year of Age, with Reference to Kind of Feeding.

Kind of feeding.	Gaining or stationary (above 20 lbs.).	20 lbs.	Gaining or stationary (below 20 lbs.).	Losing (above 20).	Losing (below 20).	Total.	General condition at one year.			
							Good.	Fair.	Poor.	Total.
Breast-fed wholly or partly for 9 months to 1 year	79	15	163	6	23	286	106	175	5	286
Cow's milk	17	1	28		5	51	17	26	8	51
Condensed milk	4		21		2	27	5	20	2	27
Solid food (no milk)		1				1		1		1
Total	100	17	212	6	30	365	128	222	15	365

Thus of the 365 babies followed, 329 at the end of the year were gaining regularly or had stationary weight, and but 36 were losing. In 340 cases the general condition was described as either "Good" or "Fair" and "Poor" in but 15.

The great majority of the children of satisfactory weight and in good or fair condition were breast fed. When breast milk failed in most instances satisfactory gains could be obtained with cow's milk and in a few instances with condensed milk. The latter was never advised, as it is an ill-balanced food for long periods. Certain mothers, however, insisted upon using it. Many of the colored mothers gave their babies solid food, toast or crackers, bread, etc., before they were five months old. In most instances, where artificial food was used, whole milk diluted with water or cereal water proved satisfactory. Top milk, skimmed milk and eiweiss milk were used in particular cases.

The causes of death in 52 fatal cases, together with reference to the kind of feeding, is tabulated as follows:—

TABLE III.

DEATHS OF 52 OF OUR 519 BABIES.

	Kind of food.					
Cause of death.	Breast.	Breast. +	Cow's milk.	Condensed.	Not stated.	Total.
Premature	3					3
Weaning[1]					1	1
Wasting or malnutrition[1]		1	2	2		5
Gastrointestinal[1]	2		11			13
Congenital weakness and convulsions	1					1
Boarded out				1	1	2
Bronchitis[2]			1			1
Pneumonia[2]	3	4	3			10
	(1 after whooping-cough and measles)		(1 after whooping-cough)			
Tuberculosis (?)	1					1
Whooping-cough		2		1		3
Diphtheria	1					1
Syphilis	1					1
Suppurating glands		1				1
Sudden; no apparent cause		1				1
Not known	4		4			8
Totals	15	9	22	4	2	52
	= 24		= 28			

White, 14 } 52.
Colored, 38 }

Legitimate, 42 } 52.
Illegitimate, 10 }
(All these were colored.)

[1] 36.5% of deaths due to gastrointestinal trouble.
[2] 21+% of deaths due to pneumonia and bronchitis.
7.8% of our breast-fed babies died.
26+% of our artificially-fed babies died.
29+% of those fed on cow's milk died.
15.1% of those on condensed milk died.
46$\frac{1}{6}$% of those who died were wholly or partly on the breast.
53$\frac{5}{6}$% of those who died were artificially-fed babies.

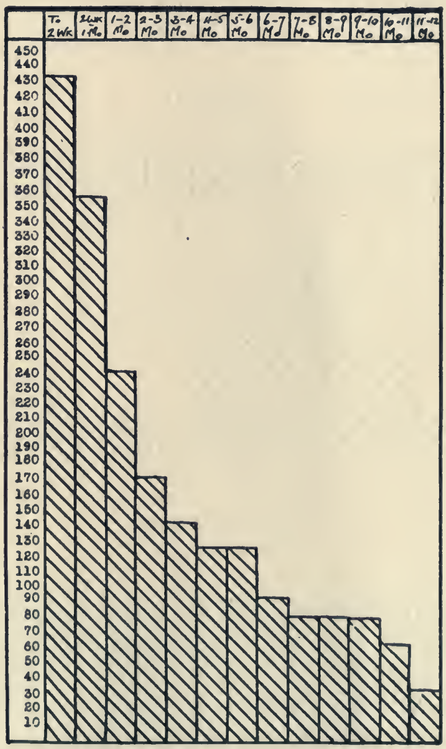
It will be noticed that nearly all of the deaths in the 15 breast-fed babies occurred from the result of conditions that could not be attributable to feeding, whereas 11 of the 21 deaths among babies fed on cow's milk were due to gastrointestinal disease. In general, the mortality among the breast-fed babies was 7.8 per cent., while that of the artificially-fed babies was about 20 per cent. These results present a strong argument for the encouragement of breast feeding, if we would save a large proportion of the young infants of the working classes. The frequent visits of the nurses and their supervision undoubtedly saved many lives among the artificially-fed babies, but could not reduce the mortality to anything approaching that of babies receiving mother's milk.

The truth is that artificial feeding is at best a comparatively dangerous procedure and can only be made tolerably satisfactory when the mother or caretaker is intelligent and can devote much time to the baby and has proper facilities for preparing its food. It is difficult to secure these conditions in the home of the average working woman. At the same time it is of interest to note that while the percentage of our breast-fed babies that died is only a little over one-fourth that of those artificially-fed, yet of the total number of deaths 46 per cent. were breast-fed either wholly or partly, whilst 54 per cent. were artificially-fed. In a similar investigation regarding the feeding of 563 babies who died during this year (most of them during the winter months), we found that 57 per cent. were being fed wholly or partly on the breast, while only 43 per cent. were artificially-fed. On the other hand a little less than 7.4 per cent. of the breast-fed babies died from gastrointestinal troubles, while 50 per cent. of those artificially-fed died from these complaints. Had the investigation been continued more thoroughly into the summer, the percentage of artificially-fed babies would certainly have been greater. But the above figures go to emphasize the fact that while breast feeding is undoubtedly one of the most important factors in preventing infant mortality, yet it is not the only one, and the care of the nursing baby is of very great importance also in our preventive work.

A considerable number of our colored infants' deaths occurred among illegitimate babies. For this unfortunate group almost nothing at present is done; many of them are boarded out in homes in which they must shortly succumb from neglect and bad feeding. The only approved way of helping the mother morally and saving the life of her child is to keep mother and child together. This is being done successfully with a small group of unfortunate white women, but only a beginning has been made in an earnest effort to lessen this aspect of one of our greatest social evils.

The age at which mortality occurred among babies under twelve months in the entire city during the year, October, 1910, October, 1911, is indicated in the following diagram:—

Table IV.



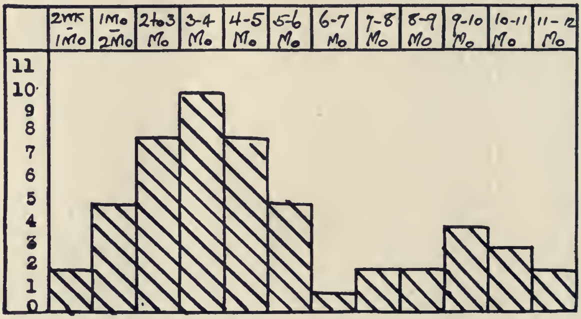
REPRESENTS DEATH STATISTICS OF 2,064 BABIES, SHOWING AGE AT TIME OF DEATH.

Total number of deaths, 2,064; white, 1,484; colored, 580 (about 28%). Estimated population, 566,844; white, 480,847; colored, 85,997 (about 15 1-5%).

It is evident that the death rate is greatest in earliest infancy, 58.8 per cent. dying during the first three months of life and decreasing steadily throughout the year. It has been shown that the efforts thus far made to save babies' lives have been most effective after three months of age, and comparatively little progress has been made before this period. In fact, Sir George Newman, of England, asserts that the infant mortality for the first three months of life is perhaps increasing, and this fact greatly retards the total decrease in the infant death rate.

The deaths in our series, although too few to warrant unqualified statements, suggest that with the proper kind of help at the right time many of these very early deaths can be avoided.

Table V.



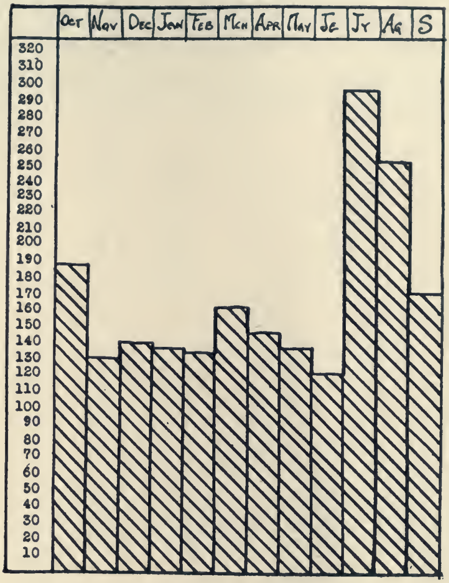
Deaths of 52 babies, from two weeks to one year, according to age at death.

But two of our infant cases were lost in the second fortnight of life, but 30 per cent. before the third month. We were able, therefore, at least to prolong the life of many delicate infants who would otherwise have quickly succumbed.

The seasonal mortality of the city cases and of our own is indicated on Tables VI. and VII.

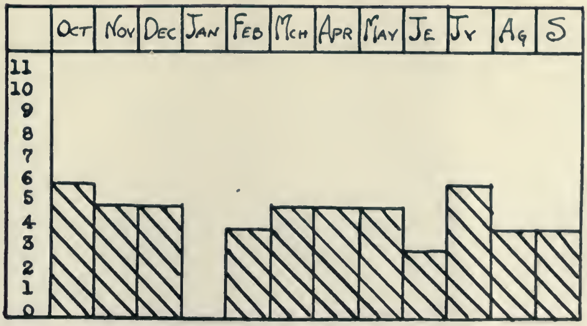
It will be noted that the great increase in the number of deaths among infants occurring in July and August, and due to intestinal disorders, did not take place among the babies of our series. This gives strong ground for the hope that the widespread fatal epidemics among infants in the hot weather can in a large measure be controlled by careful supervision and diet.

TABLE VI.



Represents death statistics of 2,064 babies, showing month in which death occurred.

TABLE VII.



Deaths of 52 babies, from two weeks to one year, according to month of death.

The relation between the income of the family and the well-being of the baby is strikingly brought out in the following statistics:—

TABLE VIII.

TABULATION ACCORDING TO INCOME OF FATHER OF 534 FAMILIES WHERE BABIES DIED UNDER ONE YEAR OF AGE IN THE CITY.

	Weekly income of father.	No. of families tabulated.	W.	B.	No. stated as having irregular work.	No. of women wage-earners.	Average size of families.	Total No. of dead babies in families.	Average No. of dead babies in each family.
A.	Up to $5.00......	20	10	10	8	10	$3\frac{4}{5}$	39	1.95
	$ 5.00 to $ 8.00..	80	35	45	24	39	$3\frac{7}{8}$	155	1 95
	$ 8.00 to $10.00..	132	82	50	25	61	$3\frac{1}{3}$	253	1.91
	$10.00 to $12.50..	68	55	13	10	11	$3^{16}/_{17}$	119	1.75
B.	$12.50 to $15.00..	58	53	5	11	11	$4\frac{1}{3}$	98	1.69
	$15.00 to $20.00..	54	53	1	10	2	$4\frac{1}{3}$	97	1.77
	$20.00 to $25.00..	23	23	0	2	3	$4\frac{1}{4}$	37	1.60
	$25.00 + ...	12	11	1	2	2	$3\frac{1}{4}$	19	1.58
	Father in business for himself...	87	82	5	0	6	$4\frac{1}{3}$	136	1.56
	Total	534	404	130	92	145		953	

(*Summary of the Above Chart.*)

A. Below standard living wage.	W.		C. Irregular work.	Women wage-earners.	Of their children.
300 families, or $56\frac{1}{5}$%	182	118	67, or 22% of 300	121, or 40% of 300	566 dead, or $59\frac{1}{3}$% of total 953
B. Standard or above.					
234 families, or $43\frac{4}{5}$%	222	12	25, or $10\frac{1}{2}$% of 234	24, or $10\frac{1}{4}$% of 234	387 dead, or $40\frac{2}{3}$% of total 953

The above table represents the investigation of 534 families in which infant deaths were reported, from October 1, 1910, to

October 1, 1911. Information was obtained as to the average weekly income of the father, whether or not the mother was a wage-earner, the size of the family, the number of children who had died in the past, in the families in each group.

An income of from $650 to $780 a year, or $12.50 to $15 a week, is regarded by experts as a minimum living wage for a family of four or five persons in Baltimore. It will be noticed that 300, or 56 per cent., of the families investigated had an income of less than the standard living wage, and that the proportion of children lost was considerably larger than in the families having more income. The small wages of the father made it necessary for a larger number of the mothers to engage in outside work, in every instance to the detriment of their young babies. A similar inquiry was conducted in 421 families of the 519 babies of our series.

Table IX.

TABULATION ACCORDING TO INCOME OF FATHER OF 421 FAMILIES UNDER OUR CARE.

Weekly income of father.	No. families tabulated.	W.	B.	No stated as having irregular work.	No. of women wage-earners.*	Average size of families.	Total No. of dead babies.
A. Up to $5.00.....	8	2	6	4	5	$6\frac{1}{4}$	12
$ 5.00 to $ 8.00..	115	36	79	43	46	5	58
$ 8.00 to $10.00..	180	85	95	78	64	nearly $4\frac{2}{3}$	177
$10.00 to $12.50..	58	36	22	21	12	nearly 5	49
B. $12.50 to $15.00..	31	24	7	17	6	$4\frac{1}{2}$	38
$15.00 to $20.00..	10	7	3	3	1	$4^{7}/_{10}$	3
$20.00 to $25.00..	1	1	0	1		10 in family	1
$25.00 + ...	0						
Father in business for himself...	18	18	0	3	4	$6\frac{1}{4}$	13
Total	421	209	212	170	138*		351

TABULATION OF 421 FAMILIES IN RELATION TO STANDARD LIVING WAGE—$12.50 to $15.00.

(*Summary of the Above Table.*)

Chart	W.	C.	Irregular work.	Women wage-earners.	Of their children.
A. Below standard living wage.					
361 families, or 85¼%	159	202	146, or 40½% of 361	127, or 35⅕% of 361	296 dead, or 84⅓% of total 351
B. Standard or above.					
60 families, or 14¾%	50	10	24, or 40% of 60	11, or 18⅓% of 60	55 dead, or 15⅔% of total 351

A much larger proportion of these received wages below the standard, in part due to the large number of colored families included. The number of babies who died in proportion to the number of families is much less, however, than in the first series, and indicates that house-to-house visiting and instruction on the part of the nurses is of great value even in households suffering from extreme poverty.

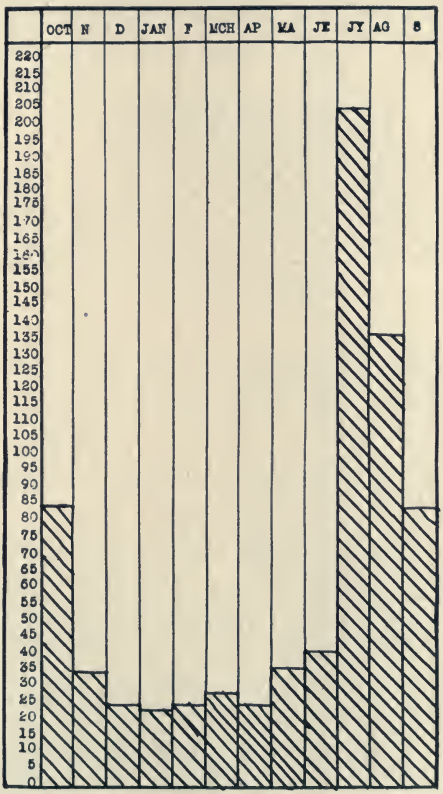
Among the many conditions which are everywhere recognized as playing a part in this production of infant mortality, three stand out most prominently—first, hot weather; second, poverty, and third, ignorance.

With regard to the climatic conditions, Table X. shows us the seasonal relation to three of the principal diseases responsible for infant mortality—gastrointestinal disorders, pneumonia and bronchitis and prematurity, which together caused about 64 per cent. of all the infant mortality during the year of our investigation.

Much can be done to mitigate the injurious effect of both heat and cold, and our experience in Baltimore and that of other cities has shown that the death rate among babies in warm weather need not be considerably larger than it is in winter if a suitable diet and moderately adequate care are provided.

The second and third conditions, poverty and ignorance, usually, but not always, travel side by side, because where poverty is acute the length of time available for the education of the children is the shortest that the State will allow, since the pittance which they can earn is necessary for the maintenance of the family. At the same time, all will agree that nothing is more essential to the health of the baby than the intelligent interest of the mother, which can only be thoroughly obtained by some leisure and training. We are convinced that this must be secured at any cost, and at almost any cost the price is cheap.

TABLE X.

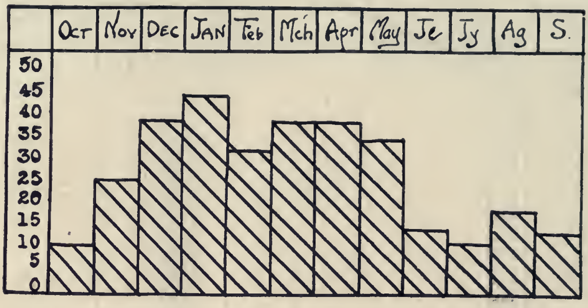


Number of deaths from gastrointestinal diseases by months, from October 1, 1910, to October 1, 1911.

If we would look forward in the future to giving the newborn baby a square deal, a fair expectance of life, we must see to it that the mothers of the future enter into the sacred relationships of wife, home-maker and mother with some knowledge of what their several duties are. Our growing girls should be taught household economics, including the right apportionment of certain incomes between rent and food, clothing, etc., and should have definite instruction in food values, cooking, and last, but not least, in matters pertaining to personal hygiene and to the care of the children. If the future generation of girls could come to full maturity with the knowledge of these matters, even the low wage standards would cease to produce such direful results in the

Table XI.

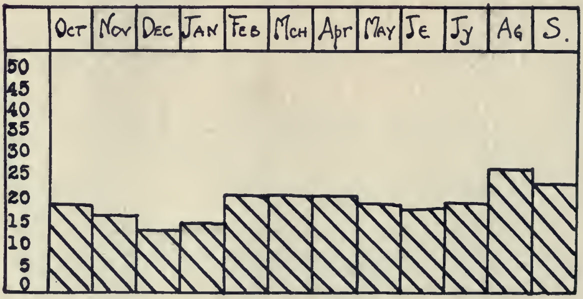
NUMBER OF DEATHS FROM PNEUMONIA AND BRONCHITIS ACCORDING TO MONTHS, FROM OCTOBER 1, 1910, TO OCTOBER 1, 1911.



This represents 328 deaths, or 15 7-17% of 2,064 deaths, of infants under one year in Baltimore.

Table XII.

NUMBER OF DEATHS FROM PREMATURITY ACCORDING TO MONTHS, FROM OCTOBER 1, 1910, TO OCTOBER 1, 1911.



This represents 251 deaths, or 12 1-6% of 2,064 deaths, of infants under one year in Baltimore.

family life and in the health of children. A low wage thriftily administered is preferable to a low wage supplemented by the outside work of the mother at the expense of the home, for it is only by the loving, intelligent care of the mother in her own home that the well-being of the infant and growing child can be secured. We may do something in later life to make up for neglect of early training, but it is much more difficult to straighten a crooked tree than to keep it straight in the first instance. We should arrange for adequate schools both day and night, at which this training is given, and all girls should be required to attend. The practicability of living on the standard living wage should be taught and demonstrated. In short, technical schools for girls, at which they can be prepared for their life work as boys are for theirs, should be widely established, and the art of home-making again recognized to be a worthy profession.

SUMMARY

1. To render efficient aid to the dependent infant, that is, one for whom a fair chance is not provided, it is important to help the expectant mother and to follow the baby from birth throughout its infancy.

2. The average weight of the babies of our series was somewhat above the standard at first, but fell below the standard in a few weeks, because of the lack of adequate care.

3. Sixty to 80 per cent. of workingwomen can nurse their own babies if encouraged to do so. A large majority of the bottle babies in our series were weaned unnecessarily. It is much easier for a busy housekeeper to nurse her baby than to give up the time required to properly prepare its bottle feedings. The natural method is much safer for the baby.

4. When the mother cannot nurse her baby, she can, if she will, learn how to feed it satisfactorily on cow's milk.

5. More study must be directed to the conservation of infant lives during their first three months.

6. The epidemics in summer of gastrointestinal diseases, and in winter of pulmonary diseases, among babies can be largely avoided if they are given proper care and diet.

7. The infant mortality is, as a rule, inversely to the income of the family.

8. Among the chief factors concerned with the large death rate at present occurring in infancy may be mentioned continuous hot weather, paternal poverty and maternal ignorance, and the greatest of these is *ignorance*.

9. We strongly urge, as the result of our investigation, to meet the immediate necessities, a great increase in the instruction to mothers, by physicians and nurses, concerning the care and feeding of their infants and a better milk supply. To save the infants of the future, we recommend a far more thorough and general education of girls in personal hygiene and household economics, including a knowledge of the fundamental requirements necessary to the healthy birth and rearing of children.

ALIMENTARY ANAPHYLAXIS FOR EGGS.—Ed Lesné and Ch. Richet (*Arch. de Méd. Des. Enf.*, February, 1913) says that anaphylaxis for eggs occurs generally in young children, sometimes combined with anaphylaxis for milk. It is generally shown after raw eggs have been administered in considerable amounts. When eggs are mixed with flour they are better borne. Both white and yolk cause this phenomenon. Slight signs of anaphylaxis may be seen in adults, while in children its manifestations are acute and alarming. Anaphylaxis is more often seen in children who have chronic indigestion, and is shown by cutaneous and vasomotor symptoms, such as urticaria, prurigo, eczema, and partial edemas, migraine and gastrointestinal troubles. In severe cases the onset is sudden, after indigestion, from the use of small quantities of eggs. There are nausea, violent vomiting, pain in the abdomen and diarrhea, followed by collapse and small pulse. Albuminuria, asthmatic symptoms, convulsions and dyspnea may all occur. The curve is slow with a prolonged convalescence. The symptoms last from five hours to three days. The prognosis is good. The essential cause of this effect is the previous indigestion, not the ingestion of the eggs. Treatment will consist of prevention, by means of care in the use of eggs in young children. A child under five years of age should not take more than one egg in twenty-four hours. Eggs should be cut off for some days, and when used again should be given in very small quantities. A purely vegetarian diet may be maintained for a time with good results.

THE WET NURSING OF FOUNDLINGS.

BY W. ESTELL LEE, M.D.,

Philadelphia, Pa.

The object of the Children's Aid Society of Pennsylvania is to place homeless and neglected children, with or without payment, according to circumstances, in private families, usually in the country districts of the state.

The simplest form of such a problem is the placing of a normal child of a working age. This can usually be done by the Society without the payment of board. Physical defects, sickness and a decreasing age increase the difficulties to such a degree that it was impossible for the Society, before this year, to accept the extreme type of dependency, the sick infant. The unusual expense and high mortality of the work with such infants made it inadvisable for the Society to place them at board on artificial food and they therefore remained in maternities, foundling asylums and almshouses.

Believing that the mortality among these handicapped infants would be lessened if they could be provided with wet nurses, the Society decided to undertake this work. After several conferences with physicians and other representatives of the various hospitals and institutions the necessity for a bureau or directory of wet nurses was recognized and such a bureau was established by the Society in March, 1912. In addition to providing wet nurses for infants referred to them for special care the Society hoped to be able to furnish wet nurses to the physicians of the city who desired them for their private patients.

At the April joint meeting of the Philadelphia Pediatric Society and the Philadelphia Obstetrical Society a resolution was passed endorsing the effort of the Children's Aid Society.

The organization of the bureau consisted of one of the agents of the Society, a trained social worker, who was assigned to the bureau, the equipment and office force of the Society and the medical organization of the Joint Receiving Shelter of the United Charities.

The wet nurses were obtained by advertising in the daily newspapers, by personal visits to the maternity hospitals and other institutions, and by letters to the physicians and the Board of Health.

During the last eight months 153 applications were received but only 41 of them were accepted. Upon the receipt of an application a thorough investigation was made by the agent of the bureau of the social and hygienic conditions of the home. Sixty-three of the applications were rejected because of the impossible conditions in the home; 11 withdrew before investigation; 38 refused to be examined by the physician. If the applicant received the approval of the investigating agent she then was examined by the physician. This examination included a Wassermann test of the blood, and a v. Pirquet tuberculin test. Fifteen of the women were rejected by the physician; 3 because of positive Wassermann reactions. The infants received the same thorough physical examination and it is of interest to know that 3 of the infants were refused because of positive Wassermann reactions.

The infants were received from the following sources:—

Parents	4
Department of Health and Charities	17
University of Pennsylvania Hospital	4
Children's Hospital	3
Pennsylvania Hospital	1
United Hebrew Charities	1
Poor Board Coal Township	1
Total	31

All of the wet nurses, with one exception, lived within the city and short distances from the Joint Receiving Shelter. The homes were visited and inspected at least once a week by the Bureau's agent. Baby and wet nurse were seen once a week by a visiting nurse, who reported the weight and general condition of the child and the care it was receiving from the wet nurse. This report was made to the physician at the Shelter who visited the infant whenever it was necessary.

Of the 31 infants received for wet nursing, 3 died. All of these deaths occurred within one week after the infant had been received by the Society. One of the infants refused to nurse and was returned to the Philadelphia Hospital. Two of them, after showing marked improvement during the first few months, developed acute gastroenteritis. Both of these infants were taken sick while being nursed by the same Italian woman, and we feel that the unhygienic conditions of the home were the direct cause. These infants were sent to the Babies' Hospital at Wynnefield, where they recovered, and they are now placed in permanent country homes and are being fed artificially. Two infants developed acute edema. One was due to nephritis, which was treated at the Children's Hospital, the child recovering. While at the Children's Hospital this child was wet nursed. The other case of edema was of unknown origin, and after ten days in the Philadelphia Hospital he recovered and is now being wet nursed. The remaining 23 infants developed into normal healthy babies, as shown by our charts and photographs; 8 of them have been weaned, placed upon artificial food and sent to permanent country homes.

Not the least of the difficulties of such a problem is that of cost. At first the fees demanded by the women were impossible. Some asking as much as $50 a week. And of the 41 nurses accepted, 15 withdrew because we could not give them the amount they desired. But the fictitious character of such fees is shown by the amounts paid:—

Minimum boarding rate per week	$2.50
Maximum " " " "	6.00
Average " " " "	3.52

With the organization of the Children's Aid Society a trained worker and the efficient medical equipment of the Joint Receiving Shelter of the United Charities the expense of such an undertaking was materially lessened.

COST OF THE WET NURSING BUREAU.

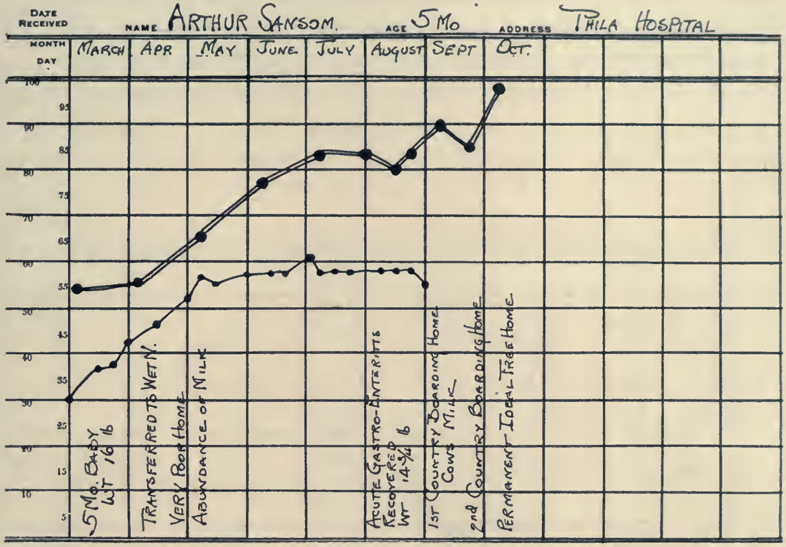
1.—Total medical expenditure	$ 52.27
2.— " visiting nurse expenditure	238.40
3.— " advertising	87.48
4.— " cost of trained agent	525.00
5.— " " " incidentals, photographs, etc.	17.00
6.— " " " transportation	292.30
7— " board for babies	1,325.08
	$2,537.53

COST PER WEEK.

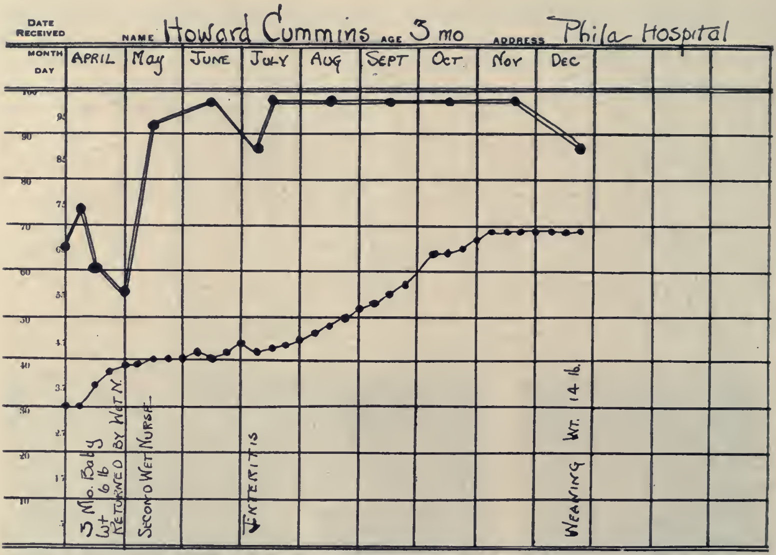
1.—Average boarding rate per child per week	$3.52
2.— " overhead cost " " " "	3.02
Average cost per child per week	$6.54

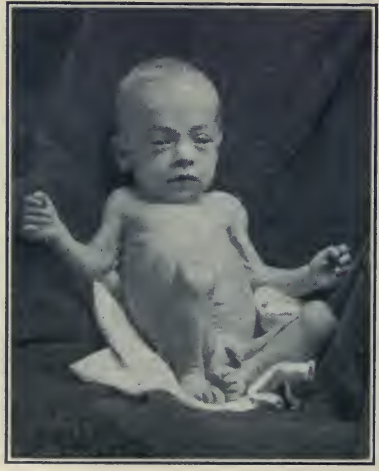
We have tried to record the progress of the babies with photographs and charts. Whenever possible a photograph was taken of the infant when it was received by the Society and again at the time of its discharge. Coit's method of scoring and charting viability seemed peculiarly adapted to this work. Assuming that the chief factors governing the viability of the child are management, environment, nourishment and the physical condition, Coit believes these factors are related to each other in the following way: Management and environment, twenty-five; nourishment, twenty-five, and physical condition, fifty. At the end of each month the infant's score was computed and charted and a line connecting these monthly scores is the viability curve. The upper double line in the charts is this viability curve. The lower single line represents the weight curve.

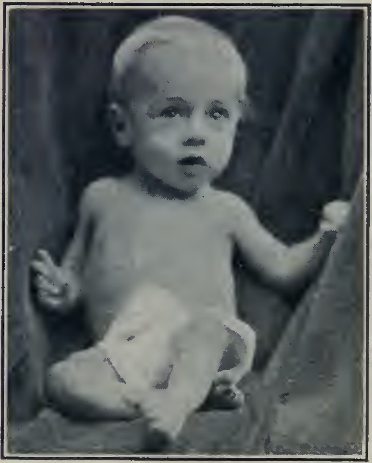
Arthur Sansom, a white male, six months of age, was received from the Department of Health and Charities. A letter accompanying the child read as follows: "The child has marasmus and is dwindling daily; a wet nurse might be beneficial and I hope that the child may have a chance. We all realize that this child's case is a forlorn hope." When received he weighed 6 pounds, 10 ounces and was in a pitiable condition. He was placed with a nursing mother who had three other small children and the home conditions were far from ideal, but the baby improved immediately, gaining 5 ounces during the first three days. At the end of the first month he had gained 1 pound, 10 ounces and when weaned at the end of the seventh month he had gained 8 pounds, 2 ounces.



Howard Cummins, a white male child, three months old, was received from the Department of Health and Charities, weighing 6 pounds, 1 ounce. He had been bottle-fed, but was gradually losing weight. He was placed with a nursing mother, who returned him the following morning because she was frightened by his delicate condition. At this time he had a fever and cough and was sent back to the Philadelphia Hospital. After remaining two weeks in the hospital on modified milk and losing 5

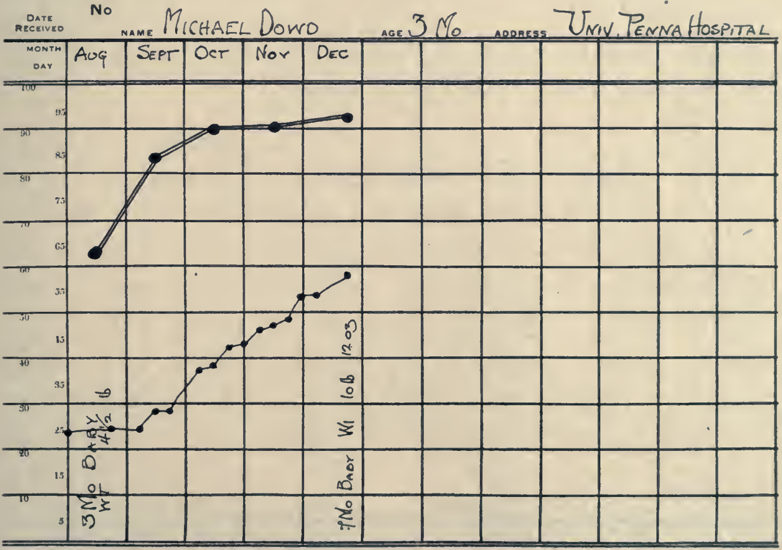




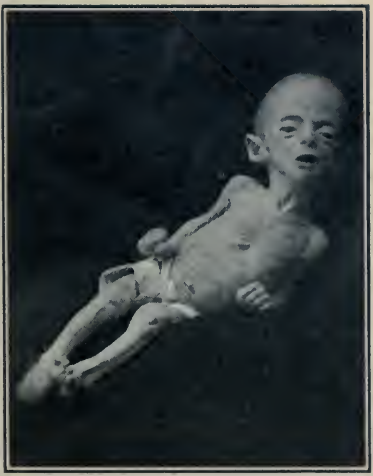


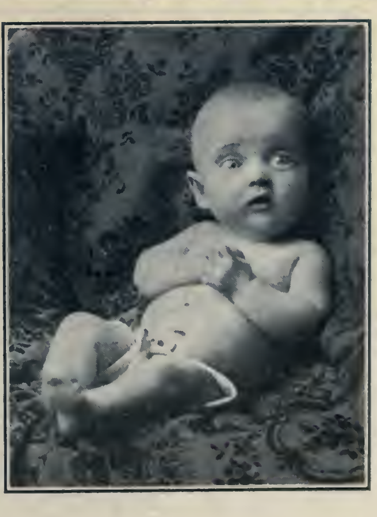
ounces in weight, he was placed with another nursing mother. This nurse was unusually good, and, although the child was difficult to manage, she took a great interest in him, and at the end of the first month he had gained 1 pound, seven ounces. This child was always troubled with colic. During the ten months of breast-feeding he has gained 9 pounds, 12 ounces.

Michael Dowd, a white male infant, three months old, was referred by the University of Pennsylvania Hospital because



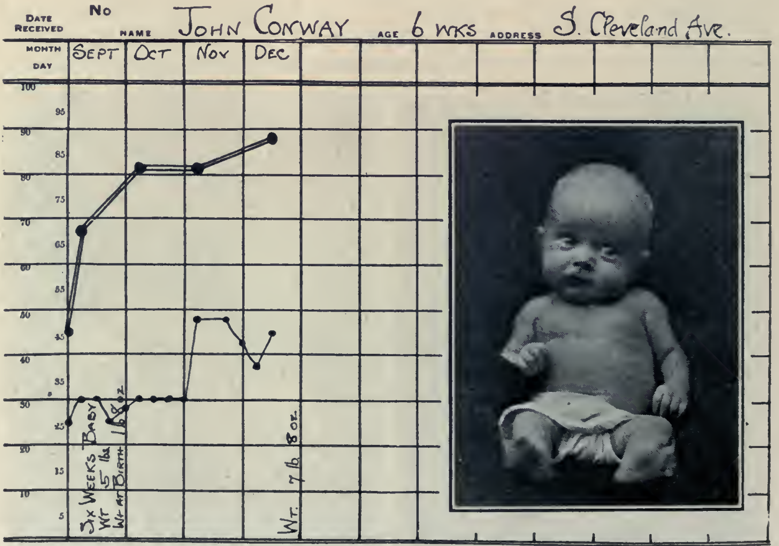
Date Received No Name Michael Dowd Age 3 Mo Address Univ. Penna Hospital





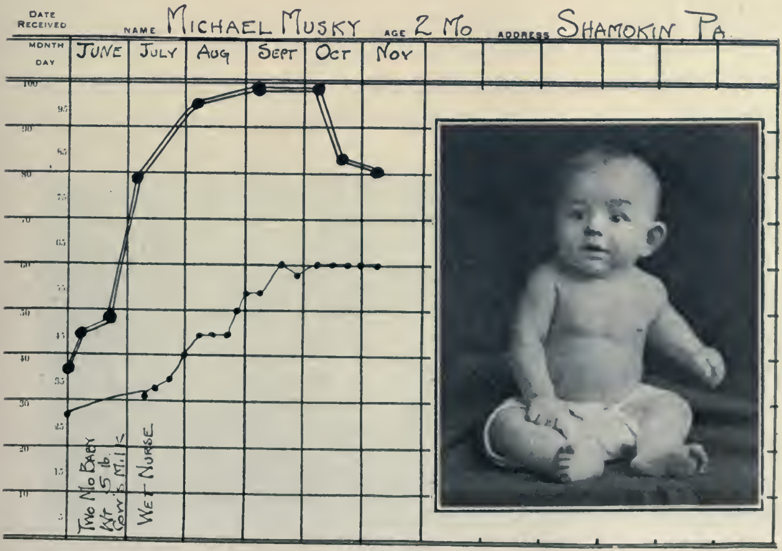
the child was rapidly failing on artificial food. He had been in the hospital one month. When he was received by the Society he weighed 4 pounds, 3 ounces and was very much emaciated. The bowel movements were green and full of curds, eight to ten movements daily. He was placed with a nursing mother and at the end of the first week the bowel movements were normal in character. During the first month he gained 1 pound, 11 ounces. The child remained perfectly normal during the five months of wet nursing and gained 8 pounds. He was then returned to the hospital of the University of Pennsylvania, where he was weaned, and has now been returned to his parents.

John Conway, a white male infant, five weeks old. This child was a premature infant, being born at the fifth month, weighing 1½ pounds. He was immediately placed in an incubator at one of the public parks in the city. While in the incubator he was wet nursed, and after five weeks he had gained 4 pounds, 10 ounces. When received by the Society he weighed 5 pounds, 10 ounces with clothing. He was placed with a nursing mother, and though there was no gain in weight during the first month

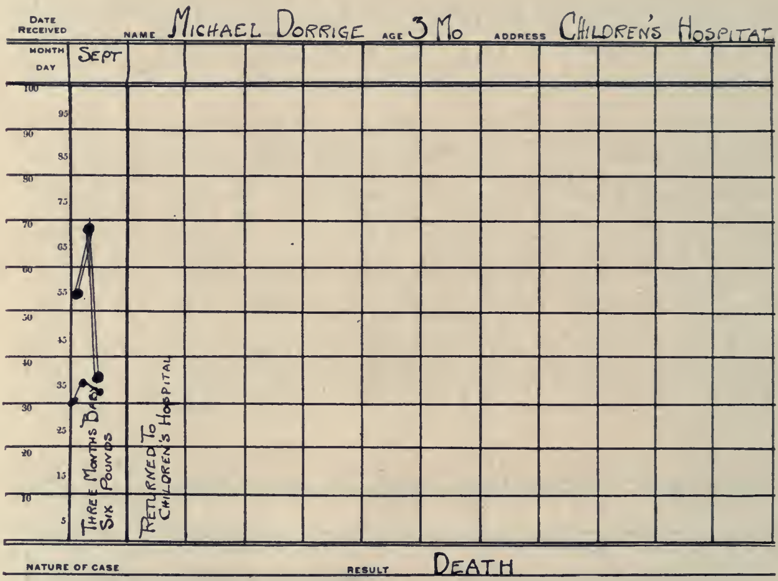


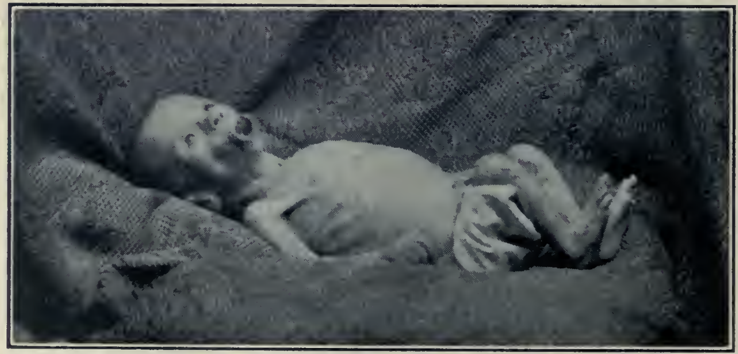
there was an increase of 3 pounds at the end of the third month. He is still being breast-fed after five months and has gained 5½ pounds.

Michael Musky, a white male infant, two months old, was received from the Poor Board of Coal Township. When received by the Society he weighed 5½ pounds. He had been fed proprietary foods and cow's milk. His condition was so precarious that wet nursing was advised. While waiting for a Wassermann test he was placed upon a 3.6.1 milk formula. It was then discovered that he had been always given paregoric for sleeplessness and colic and "required at least one teaspoonful each night." During the two weeks on the modified milk formula he lost 1 pound. He was then placed with a nursing mother, and, although there was some difficulty breaking the paregoric habit, he quickly adapted himself to the new conditions. During the first month of wet nursing he gained 2½ pounds. He was taken, against our advice, by the father, from the Society at the end of five months, but during this time he had been perfectly normal and had gained 6 pounds, 8 ounces.



Michael Dorrige, a white male infant, three months old, was referred by the Children's Hospital because he was rapidly failing upon artificial food. When received he weighed 6 pounds and was very much emaciated. He was placed with a nursing mother and during the first week he gained 1 pound in weight, but then he failed rapidly and was returned to the hospital on the tenth day, and the following day he died of inanition in the hospital.





WHAT CAN BE DONE TO PREVENT MILK POISONING.*

BY WILLIAM N. BRADLEY, M.D.,
Philadelphia.

On October 9, 1912, there was brought to the medical dispensary of the Children's Hospital, Stanley H., aged ten months, colored, with the following symptoms: Baby was restless, crying with pain and discomfort. This condition had existed for twenty-four hours.

The personal history was as follows: First child, born at full time, labor normal. The baby had been fed until three months of age on a mixture of one-half milk and one-half barley water. From that time until it was brought to the dispensary it was fed on a mixture containing two-thirds milk.

On examination the temperature was found to be 101$\frac{2}{5}$°F., pulse rapid and weak, tongue coated, abdomen distended, bowels constipated, no vomiting. Before the baby left the hospital, however, it vomited a large quantity of sour, curdled milk. The child was greatly prostrated.

A diagnosis of milk poisoning was made and suitable treatment instituted. However, the baby died twelve hours later.

Investigation of this infant's source of milk supply revealed the fact that the milk was purchased each day from a street vender, who dipped it from an open can. Milk purchased a few days later from this same dealer, when examined, showed a very high bacterial count and the presence of streptococci and pus cells. Further investigation disclosed the fact that the vender was not a reputable dealer. His milk supply was kept in the back yard and sold on the street from an open can.

This is only one of the many cases that come under the notice of all physicians during the hot summer months and which suggested the subject for this discussion.

The scope of such a paper is obviously too broad to be covered adequately in the short time at our disposal. The subject has been so ably handled by such men as Rosenau, Schorer, and our own Drs. J. P. C. Griffith, S. McC. Hamill, D. J. M. Miller and others, that very little can be added that is new. But the problem is such a vital one, and there is so much still to be accomplished that one may be pardoned for again bringing the subject before the medical profession. In spite of our best efforts this summer, hundreds of babies will die, many from milk poisoning. The importance of the subject, therefore, makes it imperative that we leave no stone unturned to minimize the dangers from this source.

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* Read before the Philadelphia Pediatric Society, May 13, 1913.

The cause of milk poisoning is obviously the presence of pathogenic bacteria or their toxic products in the milk.

A brief consideration of the many sources of infection to which the milk is exposed in its course from cow to consumer will readily show how difficult it is to obtain a milk comparatively free from bacteria.

The source of the milk, the cow, may be diseased, and the milk laden with pathogenic germs at the very start. Of the diseases of the cow, tuberculosis is the most important. E. C. Schroeder states that probably not less than 20 per cent. of our American dairy cows are to some extent affected with tuberculosis, and that fully 40 per cent. of these expel tubercle bacilli with their excretions, which is the most common source of infection of the milk. Other pathologic conditions which may exist in the cow are foot and mouth disease, cow-pox, mammitis, actinomycosis, anthrax, rabies, gastroenteritis and milk-sickness. All these conditions are transmissible.

The environment of the cow is often unsanitary. Many of the stables are without ventilation and light, badly kept and irregularly cleaned. The cows are often improperly cared for and dirty. The milker is frequently uncleanly in his personal habits, neglecting to wash his hands before milking, and addicted to certain disgusting habits prevalent among milkers. On many farms very little attention is given to the sterilization of utensils; open pails are used, allowing dust and dirt to freely enter. So throughout the production and handling on the farm, either from ignorance or carelessness, little thought is given to obtaining or preserving a clean milk.

The existence of such conditions is possible only because of the great demand for milk in the large cities. The supply must be drawn from many farms scattered over a very large area. Creameries or receiving stations obtain the milk from the farmers in each district, and ship it to dairies in the city. Such an indirect system necessitates much handling, thereby multiplying the possibilities of infection.

The time consumed in transportation from the farm to the city renders the milk at least forty-eight hours old before delivery to the consumer. The age promotes the growth of bacteria, and unless thoroughly iced the milk spoils readily.

On arrival at the dairy, the milk is sampled to eliminate the sour milk before mixing. This duty is usually entrusted to one man, who, in a poorly supervised dairy, pursues a method which he finds convenient. A common procedure is to pour a portion of milk into the cover of the can, taste it, and return the remainder and the cover to the can. Such a practice needs no comment.

The danger which lurks in the empty bottle is obvious. The ninth annual report of the Board of Health, Montclair, N. J., 1903, reports an epidemic of typhoid fever which was traced directly to bottles collected from a house where typhoid existed, refilled and distributed without sterilization. Such an occurrence is only a natural consequence when we consider that bottles are collected from homes not only where contagious diseases exist, but where the bottles are used as cuspidors and urinals.

The early hour of distribution gives us the spectacle of the milk bottle standing in the sun for an hour or two before it is rescued from the door-step. Even in the home proper care of the milk is disregarded. Frequently the uncovered bottle stands on the kitchen table until late into the morning, exposed to warmth, dirt and flies. These conditions create an ideal culture medium and a poisonous food.

While infection is possible from any of these sources, it is probable that the milk is primarily contaminated at the farm. The farmer, independent because of the great demand, finds no difficulty in disposing of his milk. If one dairyman maintains a standard of cleanliness so high that the requirements inconvenience him, he can readily find a less scrupulous dealer willing to risk the inferior milk. The conditions under which the milk is produced, therefore, are in the hands of the individual farmer.

The question naturally arises, "Are there no legal requirements to which the farmer must conform?"

The Board of Health of Philadelphia prescribes certain regulations governing the production of milk on the farm, but the difficulty lies in their enforcement. Lack of funds permits only of infrequent and irregular inspection. However, any evidence of an infected milk supply receives the prompt investigation of the Board of Health. In the absence of adequate supervision the Health Department endeavors to raise the standard of the milk by encouraging a spirit of competition among the farmers. A score card is provided on which a grading is given each farmer for the conditions under which his milk is produced. The natural desire of each man to make as good a showing as his neighbor has been responsible for some degree of improvement.

It seems fitting to mention in this connection that a bill has been recently submitted to the legislature at Harrisburg which has for its object sanitary production and handling of all market milk. It provides for a thorough and regular state or municipal inspection. It states that it shall be unlawful to sell milk under the name "Certified Milk" unless the certification was made under the authority of a duly organized medical milk commission, recognized by the American Association of Medical Milk Commissions. This bill should receive the hearty endorsement of this Society.

There are various types of infection which may be conveyed by unclean or infected milk. The most prevalent of these are tuberculosis, typhoid fever, diphtheria, scarlet fever, streptococcus sore throat and acute gastroenteritis.

It has been demonstrated that virulent tuberculosis can be found in milk three days old, in buttermilk twelve days old, and in butter one hundred and sixty-one days old. Tuberculosis may reach the lungs from the digestive tract by way of the thoracic lymph duct, and there produce pulmonary tuberculosis.

A brief survey of the typhoid epidemics shows that milk may convey this infection. John W. Trask quotes Busey and Kober's results of a study of typhoid epidemics. In the majority of cases the disease existed at the farm or dairy and the infection was conveyed in various ways. The same authors have investigated 28 diphtheria and 74 scarlet fever epidemics also traceable to infected milk.

Epidemics of streptococcus sore throat have recently been reported occurring at Chicago, Baltimore and in Massachusetts, which in each instance were conveyed by milk.

But by far the most devastating effects of impure milk are evidenced by digestive disturbances particularly in infants.

Various statistics show that ten artificially-fed infants die of diarrhea to one that is breast-fed. This high mortality among bottle-fed infants is unquestionably due to milk poisoning. To judge of the great number of cases of milk poisoning which occur we must add to the mortality statistics the much larger number who become infected but who do not succumb. The degree of infectiousness of the milk depends on its bacterial count, which is determined by enumerating the bacterial content per c.c. It is true that all bacteria in milk are not pathogenic; but a low bacterial count indicates the presence of proportionately few pathogenic bacteria.

Therefore, by keeping the count comparatively low with cleanly methods and ice, we diminish the possibility of the presence of a large number of disease-producing bacteria and their dangerous toxic products.

Rosenau states that the number of bacteria depends upon three circumstances, viz., time, warmth, dirt. Therefore the high bacterial count denotes the operation of any one or any combination of these three factors.

We are dependent almost entirely upon the enumeration of the bacteria to determine the character of the milk, as a qualitative examination requires too much time for practical purposes.

Milk is offered for sale on the Philadelphia market under several classifications or grades, viz., raw dipped milk, raw bottled milk, pasteurized milk, certified milk. Raw dipped milk is, without question, a dangerous product and its sale should not be tolerated. A recent ruling of the court provides for its sale under certain restrictions.

A comparative study of the bacterial counts of bottled and dipped milks, made by the Board of Health of Philadelphia, covering the first ten months of 1912, proves the dangerous character of the latter.

Bacterial Count.	Samples Bottled Milk.		Samples Dipped Milk.	
Under 50,000	52	58.4%	10	4.1%
One sample no count.				
50,000 to 100,000	19	21.4%	28	12.1%
100,000 to 500,000	13	14.9%	110	47.4%
500,000 to 1,000,000	2	2.2%	27	11.6%
Over 1,000,000	3	3.4%	57	24.6%
Total number samples	89		232	

It is evident from the foregoing that ordinary market milk is unsafe and unfit for use because of the large numbers of bacteria present.

Our only protection against possible infection from this source lies in subjecting the milk to a process which will destroy the bacteria without disturbing its nutritive value. Such a process is termed pasteurization.

Schorer, quoting the Secretary of Agriculture, defines pasteurization as the process of heating milk to a temperature below the boiling point, but sufficiently high to destroy most of the active organisms present, then immediately cooled to 50°F. or lower.

As is well known, the process was first worked out by Pasteur in 1860 to 1864 as a means of preserving wine and beer. But this process as applied to milk should have but one object, viz., to render safe and fit for use a raw milk which contains pathogenic bacteria as a result of careless production. Pasteurization for the purpose of preserving a stale milk or to disguise a dirty milk is illegitimate.

There are at present two methods of pasteurization in commercial use. One is the "flash method," by which the milk is momentarily heated as high as 175°F., then immediately cooled. This method is condemned by most authorities as unreliable. The other method is the "holding process," by which the milk is held in tanks and maintained at a temperature of 145°F. for from thirty to forty-five minutes. This plan gives the most satisfactory results. But no form of commercial pasteurization is entirely reliable. This fact was demonstrated by Schorer and Rosenau in their tests to determine the degree of efficiency attained under conditions which commonly obtain in commercial pasteurization. They found that seven minutes are required for a pasteurizing heater of the type used to attain a satisfactory working basis. Therefore, milk passed through the holder during the first ten minutes is imperfectly pasteurized and should be returned to the heater. They further demonstrated that if milk is maintained at a temperature of 140°F. for twenty minutes, tubercle, typhoid and diphtheria bacilli existing therein, as well as all bacterial toxins, will be destroyed. Because of the uncertain results of commercial pasteurization the best temperature to meet practical conditions is 145°F., and the milk held at this temperature for from thirty to forty-five minutes. The author's conclusions emphasize the necessity for official supervision over all pasteurizing plants.

Pasteurized milk should be given as much care as raw milk. It should be bottled in sterile bottles and kept on ice until used. Pasteurized milk spoils exactly as raw milk spoils.

A comparative investigation of the toxicity of raw and pasteurized milk made by the Department of Health of Chicago gave some interesting results.

There were three series of tests made.

Two c.c. of a sample of raw milk purchased on the market were injected into the abdominal cavity of each of seven guinea pigs. The first injection was made when the milk was one day old, the last when fifteen days old, and the others at varying intervals between. In every case the pig died within twenty-four hours after injection. A similar series of injections covering the same period was made with a sample of the same milk pasteurized. In these cases the pigs showed no effect until the milk was eleven days old, on which date and thereafter it caused the death of the animal injected.

One of the objections that has been raised against pasteurization is that it changes the chemical composition of the milk. Rosenau states that pasteurization at the temperature suggested does not appreciably affect the chemical and physical properties of the milk. Kastle and Roberts have tabulated the temperatures at which the various enzymes and ferments present in milk are destroyed. Their results corroborate Rosenau's statement. It has also been urged that heated milk gives rise to scurvy and rachitis. It is generally conceded, however, by the best authorities that these conditions are not attributable directly to heated milk. Where they exist there are probably other causes operative.

It may be true that pasteurization promotes carelessness in the production and handling of milk and discourages efforts to obtain a clean milk; nevertheless, existing conditions make it inevitable. As we have pointed out, the milk is contaminated at the farm, repeatedly exposed to infection during transportation, and is from forty-eight to seventy-two hours old when it is delivered to the consumer. Such a product is seething with bacteria.

It is imperative that we destroy these millions of organisms before they enter the digestive tract of a weak and often already poisoned infant. Therefore, we not only advocate pasteurization, but insist that every particle of milk on the Philadelphia market not certified shall be pasteurized under official supervision.

If pasteurization is to attain the highest possible efficiency, careful attention must be given to all the details of the process. Pasteurization cannot be made automatic, therefore definite training should be given the operators of a pasteurization plant, for only with intelligent and skillful handling can good results be attained. Only by scrupulous and careful cleaning can the machinery be kept free from infection. If a pasteurizer is dirty the milk will contain more bacteria after pasteurization than before.

There is considerable room for improvement in the conditions surrounding many pasteurizing plants. Proper toilet facilities with an adequate soap and towel supply are an essential detail of equipment. In place of screening, filtered air would be a better means of ventilation, thereby avoiding the dust and dirt of the street air.

Pasteurization is too vital a subject to be left to the whims of the average individual dealer. Any variation of temperature or time, any neglect or ignorance on the part of an operator, may result in serious harm. There is very great variation existing in methods of pasteurization at the present time, which could be entirely overcome by enforced standard regulations. Ayers and Johnson have shown that out of 219 pasteurizing plants in different cities, 75 are using the holding process, with a variation of temperature from 130° to 170° F.; 144 are using the flash method, varying from 140° to 180° F. Expert official supervision would obviate this lack of uniformity.

It has been urged that pasteurization in the home would eliminate some of the objections to commercial pasteurization. Some recent experiments with methods usually recommended for home use gave varying results.

The method which gave the most satisfaction was one which is in use at the Babies' Hospital of Philadelphia.

Five quarts of boiling water are set aside for ten minutes, during which time the temperature drops to 181°F. The bottles of milk are then placed in this water, covered, and allowed to stand for thirty minutes. The following table shows the temperatures of the milk, taken at intervals of five minutes:—

After	5	minutes	138°F.
"	10	"	148°F.
"	15	"	147°F.
"	20	"	145°F.
"	25	"	143°F.
"	30	"	140°F.

While this method is efficient it requires considerable intelligence, care and time. For this reason home pasteurization is impracticable among the masses. Freeman and Nathan Straus have each devised an efficient pasteurizer for home use; but these also require more intelligence and careful attention than the average mother or caretaker has at her command.

There is very great and lamentable ignorance existing on the part of the consumer regarding the production and care of this necessary and important article of diet. Many are in the position of the old farmer, who, when asked if his milk was pasteurized, said, "No, not the milk; but one of the cows is pasteurized out in the clearin' and the other'n's stall-fed."

It is the duty of the physician as the guardian of the public health to make known the unsanitary conditions which usually surround the production and handling of the milk, and discourage the use of any but the best milk obtainable. Education by the physician along this line will create a demand for clean milk and become one of the strongest factors in raising the standard for the future.

Only milk produced under the best sanitary conditions can be conscientiously termed "clean."

The cow must be absolutely healthy and tuberculin tested; the stable light, well-ventilated, systematically cleaned and kept free from dust, dirt, flies and waste. It should be well removed from marshes and stagnant pools, and its surroundings cleared of all rubbish, accumulations of dirt, decayed vegetable and animal matter. Windows should be screened to keep out flies and other insects. No other class of animals should be permitted in the stable. The cows should be cleaned daily and the udders, flanks and tail properly clipped.

The milker should be cleanly in his personal habits, wearing a sterile white suit, and thoroughly wash and dry his hands previous to milking each cow.

The milk pail should be of the closed type and all utensils thoroughly sterilized before and after using.

The milk should be properly protected from dust, odors and flies. It should be immediately cooled to at least 45°F., and maintained at this temperature until delivered to the consumer.

All milk bottles should be sterilized, filled at the farm, capped immediately, and placed on ice. The bottling room should be kept scrupulously clean and free from odors and dust.

Milk produced under such conditions, where careful attention is given to all details, may justly be called "clean"; and its bacterial count will usually not exceed 10,000 per c.c.

Briefly, these are the requirements for the production of "certified milk" as certified to by the Association of American Milk Commissions. Only milk so produced is safe for use in infant feeding.

We therefore conclude that ordinary raw market milk is unsafe and unfit for food. Our only protection lies in efficient pasteurization. Pasteurization will not make a poor milk any better, it merely renders an infected milk less dangerous. Existing conditions demand pasteurization as a temporary safeguard, but pasteurized milk is only a makeshift for clean milk.

The large sums of money which are now used in equipping and maintaining pasteurizing plants would be expended to much better advantage in the production of clean milk.

The ultimate answer to our question lies only in the production of clean milk. The problem of producing such a milk resolves itself into that of protecting the milk from all sources of contamination to which it is exposed.

The main factors in bringing about this result will be: (1) The demand on the part of the consumer for a clean milk, (2) the enactment of laws rendering unsanitary production impossible, and (3) the enforcement of such laws by an efficient system of legal inspection.

1638 South Broad Street.

REFERENCES.

E. C. Schroeder. Bureau of Animal Industry Circular No. 153.
Hygienic Laboratory Bulletin No. 56.
E. H. Schorer. American Journal of Diseases of Children.
E. H. Schorer and M. J. Rosenau. American Journal of Research, April, 1912.
M. J. Rosenau. "The Milk Question," 1912.
Joseph H. Kastle and Norman Roberts. Bulletin No. 41, Hygienic Laboratory.
Report of the Board of Health of Chicago.
Journal American Medical Association, May 10, 1913.
D. J. M. Miller. New York Medical Journal, September 22, 1906.
S. McC. Hamill. Transactions of the Philadelphia County Medical Society, Vol. XXIV., 1903.

SOME CLINICAL EXPERIENCES WITH THE BACILLUS BULGARICUS IN ACUTE GASTROENTERITIS AND ILEOCOLITIS.*

BY JOHN F. SINCLAIR, M.D.,
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Buttermilk has been used more or less extensively in infant feeding since Salge,[1] in 1901, reported its use in the treatment of atrophic cases, and in those cases convalescent from acute digestive disturbances.

In this country, Dunn,[2] Clock[3] and others have since 1907 advocated the use of buttermilk to combat the intestinal fermentations of infancy.

More lately, Kendall[4] (1910) has drawn attention to the value of lactic acid ferments in reducing intestinal putrefaction.

Clinically, the buttermilk feedings have been frequently found to lack sufficient caloric values to adequately nourish the infant, although the prostration and toxemia has generally been less marked in cases where buttermilk has been used.

The frequent custom of boiling the buttermilk and thereby killing the lactic acid bacilli, lessened its usefulness in the treatment of intestinal conditions. Dunn[5] avoided this difficulty by pasteurizing modified milk mixtures and then "ripening" them with cultures of pure lactic acid bacilli. It appears, however, as pointed out by Clock,[6] that ordinary lactic acid bacilli in buttermilk will not survive ingestion, and cannot therefore multiply in the intestine, or produce sufficient nascent lactic acid to destroy the putrefactive bacilli.

Metchnikoff found that the bacillus lactis bulgaricus, first isolated and described by Grigoroff,[7] will live and multiply in the intestine after ingestion and does destroy putrefactive organisms. These observations have been confirmed in whole or in part by others, including Belonowsky,[8] Cohendy,[9] Herter and Kendall.[10] We are indebted to the recent presentation of this subject by Clock,[6] for our present interest in the subject.

Our report is based on the study of 32 cases in which the bacillus lactis bulgaricus was administered.

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* Read before the meeting of the Philadelphia Pediatric Society, April, 1913. (Discussion on p. 554.)

The babies were admitted to my service at the Babies' Hospital during the summer of 1912 and were, for the most part, severely ill and poorly nourished.

The ages ranged from seventeen days to two years. One was seventeen days old, 1 was seven weeks, 3 were two months, 2 were three months, 3 were four months, 1 was five months, 4 were six months, 4 were seven months, 3 were eight months, 3 were nine months, 1 was ten months, 1 was twelve months, 2 were thirteen months, 1 was fourteen months, 1 was eighteen months, and 1 was two years old.

There were 20 cases of gastroenteritis and 12 cases of ileocolitis. Of the 20 cases of gastroenteritis 1 was of the mild type (case 29); 17 were of the severe type (cases 1, 2, 3, 5, 6, 8, 9, 12, 13, 14, 18, 19, 24, 26, 27, 30 and 32); and 2 were of the toxic type (cases 11 and 16). The 12 cases of ileocolitis (cases 4, 7, 10, 15, 17, 20, 21, 22, 23, 25, 28 and 31) were all desperately ill with the exception of 4 (cases 4, 17, 23 and 28) cases, which were of a milder type. This is well shown by the fact that 6 of the 11 deaths occurring in the series of 32 cases are recorded as due to ileocolitis with or without complications.

The mild cases of gastroenteritis had been ill for two weeks before treatment with the bacillus bulgaricus was begun. The duration of the severe cases varied from three days to three months prior to the institution of the treatment. Only 8 of the 17 severe cases of gastroenteritis received the bacillus bulgaricus before the end of the third week. The treatment was begun on the fifth day in case 1; on the fifth day in case 3; on the seventh day in case 5; on the fourth day in case 6; on the ninth day in case 8; on the third day in case 9; on the eighth day in case 12, and on the sixth day in case 14. In the remaining 9 cases the treatment was instituted as follows: Case 2 after three weeks' illness; case 13 after eleven weeks' illness; case 18 after six weeks' illness; case 19 after three weeks' illness; case 24 after six weeks' illness; case 26 after three months' illness; case 27 after three weeks' illness; case 30 after four weeks' illness, and case 32 after five weeks' illness. The 2 toxic cases had been ill two weeks and three weeks respectively before treatment was started. The 12 cases of ileocolitis had been ill respectively: case 4 eight days; case 7 two weeks; case 10 five days; case 15 eight days; case 17 two weeks; case 20 eight weeks; case 21 two weeks; case 22 twelve days; case 23 ten days; case 25 four weeks; case 28 five days, and case 31 one week; prior to the administration of the bacillus bulgaricus.

The putrefactive process was cleared up and the stools became normal in the cases of gastroenteritis within five days on the average. In case 8 the stools became green two days after the administration of bacillus bulgaricus was stopped. In case 26 there was no mucous in the stools after the treatment was instituted, although the baby had been ill with chronic gastroenteritis for three months.

In seven of the 12 cases of ileocolitis the putrefactive process entirely disappeared and the stools became normal within nine days on the average. Of the 5 cases which showed no improvement, 2 cases (21 and 25) were under treatment only two days when the babies died. Case 22 died after having been treated for six days. Case 15 had been on treatment for eight days when he died. Case 7 was given bacillus bulgaricus for thirteen days before death intervened.

Of the entire series of 32 cases, 16 showed an average loss of 8⅞ ounces, and 12 showed an average gain of 6¼ ounces by the end of the first week; while the weights for four of the cases were not obtainable on account of the serious condition of the babies. Practically all who recovered showed a gratifying gain in weight upon their discharge.

Upon admission, the babies were put on water or tea; a few, later, were given barley water, albumin water, 5 per cent. dextro-maltose solution, albumin water with dextro-maltose added in sufficient quantity to make a 5 per cent. solution, or soy bean gruel in graduated strengths with or without the addition of dextro-maltose in varying percentages up to 5 per cent. Some infants were given whey, some wine whey and others whey cream mixtures. Buttermilk conserve with and without the addition of cream, buttermilk mixtures, and casein milk were given to others. A few received malt soup, a few mammala, while the majority were given modified milk mixtures. Many of the modified milk mixtures were pasteurized, some were not. All were made from milk certified to by the Milk Commission of the Philadelphia Pediatric Society. In the modified milk mixtures various diluents were used, such as water, barley water, soy bean gruel and dextrinized gruels. Sodium citrate was added to some of the modified milk mixtures, and the sugar content was controlled by the use of dextro-maltose.

Wet nurses were employed and breast feedings were given to those babies which seemed to especially need human milk. It was our aim to individualize the feedings to the needs of each baby and to supply to each the diet which its condition at the time seemed to demand.

The treatment used in addition to the administration of the bacillus lactis bulgaricus consisted in an initial dose of castor oil, and the subsequent use of colon irrigations, or gastric lavage, with normal salt solutions, as occasion demanded. Stimulants were employed, principally brandy or champagne, when indicated. as were hot packs, cold packs, adrenalin, blood serum, tannalbin, starch and laudanum enemas, and in 2 cases only bismuth subnitrate.

Considering the general condition of the majority of these babies on admission to the hospital, the length of time many of them had been ill before receiving treatment, and the severity of the types of disease with which they were suffering, it would seem that the administration of the bacillus lactis bulgaricus was of decided service in controlling the putrefactive process in the intestines, and in establishing a normal condition of the stools. Although only 1 case of the 20 cases of gastroenteritis could be classified as mild in type, there were only 5 deaths—a mortality of 25 per cent.

This speaks well for the usefulness of the bacillus lactis bulgaricus.

REFERENCES.

1. Salge. Jahrbach fur Kinderheilkunde, November, 1901.
2. Dunn. "The Use of Living Lactic Acid Bacilli to Combat Intestinal Fermentation in Infancy," ARCHIVES OF PEDIATRICS, April, 1907.
3. Clock. "Modified Buttermilk in Infant Feeding," New York Medical Journal, April 20, 1907.
4. Kendall. "Lactic Acid Bacteria—What They Are and What They Are Supposed to Do," Boston Medical and Surgical Journal, August 25, 1910.
5. Dunn. "The Treatment of Infantile Diarrhea Due to Intestinal Fermentation with Lactic Acid Bacilli," The Journal of American Medical Association, August 21, 1909, page 599.
6. Clock. "Intestinal Inplantation of the Bacillus Lactis Bulgaricus in Certain Intestinal Conditions of Infants, with Report of Cases," The Journal of American Medical Association, June 29, 1912, page 2,017.
7. Grigoroff. "Etude sur un Lait Fermente Comestible: le Kisselo mleko de Bulgarie," Revue Med. de la Suisse Romande, 1905, Vol. XXV.
8. Belonowsky. "Influence du Fermente Lactique sur la Flore des Excrements des Souris," Ann. de l'Inst. Pasteur, 1907, Vol. XXI.
9. Cohendy. "Description d'un Ferment Lactique Puissat Capable de s'Acclimater dans l'Intestin de l'Homme," Comp. Rend. Soc. de Biol., 1906.
10. Herter and Kendall. "The Fate of Bacillus Bulgaricus in the Digestive Tract of the Monkey," Journal of Biological Chemistry, 1908, Vol. V.

Case	Age	Gastro-enteritis	Ileo-colitis	Duration of illness before treatment was begun	Stools became normal in	Gain or loss in weight	Relapses	Vomiting	Fever	Complications and Sequelae	Results
1	9 weeks	Severe	......	4 days	8 days	+ 2 oz.	One	None	Subnormal	Malnutrition	Died
2	14 months	Severe	......	3 weeks	3 days	+ 16 oz.	Two	very freq.	101°–F	None	Disch'd good condition
3	8 months	Severe	......	4 days	2 days	— 1 oz.	None	None	None	None	Disch'd good condition
4	7 months	......	Mild	8 days	2 days	+ 16 oz.	One	None	None	None	Disch'd good condition
5	7 months	Severe	......	6 days	2 days	+ 6 oz.	One	Frequent	101-3-5°–F	Broncho-pneum.	Disch'd fair condition
6	7 months	Severe	......	3 days	6 days	— 12 oz.	Three	Occasional	102°–F	Vaginitis	Disch'd good condition
7	6 months	.....	Severe	2 weeks	Not improved	— 5 oz.	......	None	102°–F	None	Died
8	5 months	Severe	......	8 days	1 day	— 2 oz.	One	Occasional	Subnormal	Malnutrition	Died
9	7 months	Severe	......	2 days	15 days	— 15 oz,	None	None	101°–F	Broncho-pneum.	Disch'd good condition
10	18 months	......	Severe	4 days	14 days	— 6 oz.	None	None	100-3-5°–F	None	Disch'd good condition
11	6 months	Toxic	......	2 weeks	9 days	+ 3 oz.	None	Occasional	101-3-5°–F	Broncho-pneum.	Disch'd good condition
12	7 weeks	Severe	......	7 days	5 days	— 15 oz.	None	Once	100-4-5°–F	Malnutrition	Died
13	4 months	Severe	......	11 weeks	3 days	— 4 oz.	None	None	Subnormal	Malnutrition	Died
14	4 months	Severe	......	5 days	13 days	+ 2 oz.	None	Once	None	None	Disch'd good condition
15	3 months	......	Severe	7 days	Not improved	— 26 oz.	......	None	None	None	Died
16	10 months	Toxic	......	3 weeks	4 days	— 5 oz.	None	None	101°–F	None	Disch'd good condition
17	8½ weeks	......	Mild	2 weeks	6 days	— 4 oz.	None	None	None	None	Disch'd fair condition
18	6 months	Severe	......	6 weeks	9 days	— 13 oz.	None	Occasional	102°–F	Abscesses, bronchitis, otitis media	Disch'd fair condition
19	17 days	Severe	......	3 weeks	2 days	+ 2 oz.	None	None	Subnormal	Malnutrition	Died
20	3 months	......	Severe	8 weeks	18 days	— 10 oz.	None	None	Subnormal	Malnutrition	Died
21	9 months	......	Severe	2 weeks	Not improved	Not weighed	......	None	103°–F	Lobar-pneumonia	Died
22	2 years	......	Severe	12 days	Not improved	Not weighed	......	None	104°–F	None	Died
23	6 months	......	Mild	10 days	5 days	— 5 oz.	None	None	102-1-5°–F	None	Disch'd good condition
24	8 months	Severe	......	6 weeks	9 days	+ 3 oz.	None	Occas onal	103-2-5°–F	Abscess of scalp	Disch'd good condition
25	1 year	......	Severe	4 weeks	Not improved	Not weighed	......	None	Subnormal	Malnutrition	Died
26	4 months	Severe	......	3 months	1 day	+ 6 oz.	None	None	Subnormal	Malnutrition	Disch'd good condition
27	9 months	Severe	.. ...	3 weeks	5 days	+ 11 oz.	Two	Occasional	None	None	Disch'd good condition
28	9 months	......	Mild	4 days	3 days	+ 4 oz.	None	None	None	None	Disch'd good condition
29	13 months	Mild	......	2 weeks	2 days	+ 4 oz.	None	None	None	None	Disch'd good condition
30	2 months	Severe	......	4 weeks	5 days	— 2 oz.	Two	None	Subnormal	Malnutrition	Disch'd fair condition
31	13 months	......	Severe	1 week	20 days	Not weighed	None	None	102-3-5°–F	Bronchitis	Disch'd good condition
32	8 months	Severe	......	5 w eks	4 days	— 17 oz.	None	None	Subnormal	Malnutrition	Disch'd good condition

INFANTILE DIARRHEA CAUSED BY FRESH ALFALFA DAIRY RATION.

BY SANFORD BLUM, M.D.,
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With the present tendency to refer to bacterial origin all infantile diarrheas, obvious causes of this disorder are overlooked. Such causes exist in fresh pasturage, especially alfalfa in the dairy ration.

In the spring and summer of 1912 this was a prolific factor in the causation of gastroenteritis among infants in California. Cases of infantile diarrhea appeared synchronously with the inception of fresh alfalfa feeding, increased in number as the fresh feed was more generally utilized, diminished in frequency and ceased to occur coincidentally with the diminution of green feed and the return to a dry dairy ration.

The cases were distinctive, characterized by foul, mucoid, green, diarrheal stools, anorexia, vomiting, fever and general malaise. Urticaria occurred occasionally. The cases were comparatively mild, all ending in recovery, following reduction (in some cases) or withdrawal of the affected milk. In some instances the baby had received and thrived upon cow's milk until fresh alfalfa feeding began, when the baby promptly sickened. In other instances increase in the baby's milk food was followed by diarrhea. In some cases recovery immediately followed upon changing from fresh alfalfa milk to milk obtained from dry-fed cows. Many cases having occurred in babies on an exclusive milk diet in the clientele of a dairy feeding fresh alfalfa, such ration was discontinued and cases promptly ceased to occur in that dairy's clientele.

The absence of other disturbing factors in this milk was determined by repeated bacteriological and chemical tests of the milk and by veterinary inspection of the herd.

Typical cases follow:—

CASE I. April 21, 1912. R. C., four-and-one-half-months-old boy. Breast-fed two months. Modified milk since then.

Weight at birth	5℔
“ “ 2 months	7℔ 1 oz.
“ “ 4½ “	10℔ 2 oz.

During past twenty-four hours 7 malodorous. mucoid, green stools. Refuses food; rectal temperature, 103°F.

Report on Milk (supplied by Dairy A, where fresh alfalfa constitutes chief dairy ration).—Reaction, alkaline; specific gravity, 1,033; fat, 4 per cent.; solids, 9 per cent.; colonies bacteria per c.c., 2,800; culture, staphylococci.

Stop milk; give castor oil; feed rice water.

April 22, 1912. Three mucoid stools; temperature, 100°F. Alternate feedings, 5 ounces rice water, 5 ounces chicken broth.

April 23, 1912. One brown, watery stool; little mucus; temperature, 98°F. Began feeding diluted milk from Dairy B (minimum alfalfa in dairy ration). Recovery steady and uneventful.

Case II. April 21, 1912. F. B., four-months-old boy. Breast-fed seven weeks. Cow's milk since then (3 ounces each whole milk from Dairy A and water every 3 hours; 6 feedings in twenty-four hours).

Weight at birth	7℔ 8 oz.
“ “ 15 weeks	11℔
“ “ 16 “	10℔

Baby has had 5 or more green diarrheal stools daily for the past week. This baby received milk from Dairy A, the same dairy that supplied Case I.

Stopped milk; gave castor oil; fed rice water twenty-four hours.

April 22, 1912. Four mucoid, green stools. Feed alternately 6 ounces albumen water and 6 ounces chicken broth.

April 23, 1912. Two brown, watery stools. Continue chicken broth and begin feeding diluted milk from Dairy B. Reduce quantity at feeding to 5 ounces. Diarrhea did not recur; mucus disappeared from stools and normal color returned.

May 4, 1912. Weight, 10 pounds, 12 ounces.

Case III. May 17, 1912. J. B., six-weeks-old girl. Bottle-fed since birth and thrived on modified cow's milk (Dairy A) till last week, then lost 6 ounces. Has 3 or 4 foul, mucoid, green stools daily.

During the succeeding nine days I resorted to the expedients of reducing the strength of the formula (especially the fat), boiling the milk, substituting rice water for barley water in the formula, etc., without material effect. Baby lost additional 3 ounces and diarrheal stools continued.

May 26, 1913. Substituted milk from Dairy B for milk from Dairy A in formula without any other change. Recovery was prompt and complete.

Above cases all received milk from the same dairy (which for convenience I have designated Dairy A).

During the months of April, May, June and July, 1912, a total of 21 such cases supplied by Dairy A came under my observation. All recovered as soon as that milk was withdrawn. Among children supplied by two other dairies which fed fresh alfalfa liberally to their cows I saw additional cases in San Francisco at the same seasons. In older children and in neighboring cities the same conditions prevailed.

Cases IV. and V. June 9, 1912. R. E., seventeen-months-old girl living in Oakland. For two days has had mucoid, green stools, streaked with blood. Diet includes milk from Dairy C (where fresh alfalfa forms chief part of dairy ration at this season).

Omitted milk from diet; gave broth and egg, and recovery was prompt.

June 9, 1912. C. E., four-year-old boy (brother of above girl). Also has had mucoid, green stools for several days. Also drinks milk from Dairy C. Temperature, 101°F.; tenderness of abdomen. Withdrew milk and recovery was prompt.

Clinically, the cases were strikingly similar. They were mild enteric disturbances, accompanied by diarrhea, with little vomiting or toxic symptoms. The characteristic peculiarity of the stools was their unvarying grass-green color. This color is referable to the alfalfa dairy ration. While such ration was employed the cows at Dairy A uniformly had defecations similar to those of babies nourished by their milk—loose and grass-green.

Alfalfa is almost universally employed and deservedly popular as a dairy ration. It is correspondingly important to recognize its limitations and safeguard its employment.

While it is generally known that various weeds and feeds impart deleterious qualities to milk, fresh alfalfa as a dairy ration so far seems to have escaped adverse criticism.

Thus Henry says: "Onions, leeks, turnips, rape, etc., impart an objectionable flavor to milk, possibly apparent to all people, while the flavors imparted by green rye or corn silage are detected by some, but pass unnoticed by others." ("Feeds and Feeding," eleventh edition, section 620, p. 391.)

"The flavor of milk is very readily affected by the character of the feed, as, for instance, by turnips, garlic, wild onions, moldy hay, damaged ensilage and distillery grain. The deleterious substances excreted with the milk are usually volatile oils contained in the food. They are found in the milk . . . being eliminated rapidly through the various excretory channels." (*Hygienic Laboratory Bulletin,* 41, p. 505.)

Sonnenberger found that "milk may become dangerous to health through the elimination in the milk of poisonous substances contained in the food of cattle, especially the vegetable poisons of certain weeds which composed part of the diet of milk cows. These poisons are not destroyed by boiling the milk." (Sonnenberger: *Verb. de, gesell. f. Kinderhk.,* Wiesbaden, 1907.)

"Experts, as a rule, can detect a silage odor or flavor in the milk of silage-fed cows." (Henry: "Feeds and Feeding," 1911, section 362.)

Practically all that has been quoted above applies to the milk of cows on fresh alfalfa feed. Fresh alfalfa is so laxative as to cause in cows frequent loose, green evacuations. The milk of these cows has a faintly pungent odor and a decidedly weedy flavor (or aftermath). Such milk contains a substance (or substances) not destroyed by boiling, and irritant to the intestinal canal of children, in whom it causes mucoid, green evacuations.

However, a tolerance may be acquired, and just as the dairyman gradually introduces green feed into the dairy ration in order to avoid "bloat," so the milk of fresh-alfalfa-fed cows if gradually administered to children may be well tolerated. Indeed, not all children are sensitive to the alfalfa irritant. Of several children in a family receiving this milk, often only one shows intolerance. Weaklings often tolerate it, and it may occur that a child on this milk, although having two or three semi-solid, green evacuations daily, still makes consistent gains. This, however, is not the rule; usually in those cases where the milk of alfalfa-fed cows is not well tolerated there will result gastroenteritis with attendant diarrhea and loss in weight.

In such cases tolerance may be acquired. However, the logical procedure for the pediatrist on recognizing the cause of the trouble is to withdraw the irritant—the guilty milk.

For the dairyman who desires to feed fresh alfalfa it is indispensable to introduce it gradually into the dairy ration and to maintain with it a mixed ration.

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DOES TEETHING EVER PRODUCE MORBID SYMPTOMS?*

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One must be possessed of more than ordinary temerity to present a paper upon this vexed question to the members of a Pediatric Society; and this rashness will, perhaps, appear the greater when it is discovered that the question is answered in a somewhat reactionary manner. That much superstition still clings to the subject cannot be denied; but since the public still persists in attributing very many of the disorders of infancy to teething, and quite a goodly number of physicians continue to entertain the same idea, may there not be more in this matter than the more radical of the profession would have us believe? Modern scientific methods of investigation, it is true, have so increased our knowledge of the symptoms and causes of infantile diseases that the number of these formerly ascribed to teething has been, and is becoming, more and more curtailed. Obscure fevers, for instance, due to pyelitis, otitis, tuberculosis, pneumonia, etc., are more frequently recognized; and the same may be said of other conditions (the mouth conditions of scurvy, for example) that are but too often referred to the teeth. Still, it cannot be disputed by any fair-minded observer that primary dentition is frequently associated with local and constitutional disturbances, especially in nervous children—disturbances that are repeated with each incoming tooth so regularly, that it is difficult to escape the inference that there must be a connection between the two phenomena.

Those who would question the statement that primary dentition is ever pathologic on the ground that it is a physiologic process, appear to forget that other physiologic processes, such as pregnancy and parturition and the menopause, are frequently—nay, almost constantly—attended with much discomfort, pain and, occasionally, grave deviations from the normal; and this, often, in otherwise healthy women.

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* Read before the Philadelphia Pediatric Society, February 11, 1913.

From a consideration of the development of the primary teeth, it has been denied that teething in normal infants can produce morbid symptoms. The milk teeth are all in the jaw at birth. The opening in the alveolus is wide enough to permit their passage upward; only the dental sac, the mucous membrane and the submucous coat can cover the teeth, which move upward by calcification of their fangs, the overlying structures undergoing atrophy and absorption. Hence, it is quite true that no question of pressure, tension or obstruction arises—a fact that is further verified by the failure of the incision in gum-lancing to gap.

Most of the symptoms associated with dentition we would attribute, not to pressure, but to reflex influences, using this term in its generally accepted meaning, without attempting to define or explain it; and, by the conception that the "delicate infantile organism may react in manifest ways to a sensible irritation" (Moro), such as dentition in a susceptible and nervous infant.

According to Feer* and others, only children who are rickety become irritable, sleep poorly or have convulsions or intestinal catarrh during dentition; and in them, rachitis, and not the teething, is the cause of the symptoms. This is proved, they assert, by treatment directed toward the cause of the rachitis: After two or three months of phosphorus and of dietetic and hygienic measures, four or six teeth come through without the least disturbance. In a line with this reasoning is the opinion of Guthrie,† that teething is painful only because the gums are so, and that the gums and mouth are tender because they are the seat of gingevitis and stomatitis, as a result of gastrointestinal disturbance brought about by conditions quite separate from teething.

But other infants besides the rachitic manifest morbid symptoms during dentition, and tender gums are not by any means always attended with alimentary disturbances; nor do the latter habitually precede the former sufficiently long to act as a causative factor. May it not be that the alimentary derangements, the tender mouth and the eruption of the teeth are all but expressions of the same process, namely, a general hyperesthesia of the gastrointestinal canal, due, in turn, to the great activity of all the vital processes, undoubtedly present during the period of dentition?

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* E. Feer. *Correspondenz-blatt f. Schweizer Aertze,* Vol. XL., 1911, p. 865.

† L. Guthrie. *Practitioner,* London, Vol. LXXV., 1905, p. 547.

The frequent pathologic manifestations observed in connection with the eruption of the wisdom teeth, I hold, with those who are opposed to the doctrine of morbid dentition, as possessing no bearing upon the subject under discussion; because the wisdom teeth occupy an exceptional position, in that they are probably in a state of involution, and, frequently, because of insufficient space, meet with mechanical hindrances that determine pathologic symptoms.

The painlessness and, usually, uneventful course of the second dentition is constantly cited as an evidence that the eruption of the primary teeth cannot be guilty of the evil consequences so commonly charged to them. To the writer, it seems that this may be explained by assuming that the child, at this age, is not so readily affected by reflex influences; it does not react in the same manner or so readily to sensible irritations as in the first dentition, when the physiologic processes are so active. Some children, however, do exhibit reflex symptoms during the eruption of the permanent teeth. Recently I have observed a highly nervous girl who, during her eleventh and twelfth years, while cutting the bicuspids and second molars, suffered with acute and profuse coryza at the eruption of each tooth. As the primary tooth fell out or the new one erupted, the catarrhal symptoms promptly subsided. So apparent was the connection between the coryza and the eruption of the teeth that the child herself remarked it. I am of the opinion, also, that during the whole period of the second dentition, delicate and nervous children frequently manifest a deterioration in health, as exhibited by languor, anemia, anorexia, pale rings beneath the eyes, poor sleep and the digestive disturbances usually characterized as chronic intestinal indigestion, which, although I am unable to offer an adequate explanation for, I believe to be, in a measure, connected, in some way, with the evolution of the permanent teeth.

Feer (*loc. cit.*), who has written a most excellent article against the doctrine of morbid dentition, remarks that the frequent coincidence between the eruption of a tooth and a disease process would be a very good evidence of the interdependence of the two phenomena, if it could be absolutely demonstrated; but he adds that it requires exact observation, and not general impressions, to establish such a connection; that in the scientific literature of the last thirty years essays on morbid dentition fail entirely; that most works on children's diseases deny totally or dismiss the subject with a few words—or admit only that teething may cause a little restlessness or mouth irritation; and, finally, that in a careful study by himself in the Heidelberg Children's Clinic for a whole year, nothing of importance could be found (neither loss of weight nor increased temperature, nor any other symptom) in teething infants. In a few, sleeplessness, restlessness and anorexia, before the eruption of a tooth, were found; but as such symptoms were common in babies not cutting their teeth they could not be attributed to the latter process.

To the writer it seems that such statements as these can only be reconciled with the experiences of others by reflecting that in all observations the element of the personal equation cannot be eliminated. Equally good observers may entertain diametrically opposite views and experience quite dissimilar impressions from the contemplation of any natural process or object. L. E. Holt, on the other hand, in the fifth edition of his work on children, says: "Although formerly of the opinion that simple dentition never causes symptoms, I have been compelled by increased experience to admit that dentition may produce reflex symptoms, sometimes even of alarming character, especially in delicate and nervous children." The pendulum, indeed, now tends to occupy a median position. Scientific and thoughtful observers no longer entertain the absurd and extreme views of the older physicians; while, on the other hand, not a few are abandoning the equally extreme position of those who deny entirely the existence of a morbid dentition. We, who occupy a middle ground, do not contend that teething may cause an otitis media; although we acknowledge that it may produce an otalgia. We may hold that it may cause fever, or possibly convulsions; but never pyelitis or meningitis. Certain local manifestations and reflex disturbances, we believe, it may produce in about half the number of children; and our belief is founded upon our own clinical experience and that of many able observers.

In considering the symptoms associated with dentition, some repetition of what has already been touched upon is unavoidable. The local symptoms include pain, heat, swelling and, perhaps, tenderness of the gums, catarrhal stomatitis, salivation and the biting of hard objects. Whether the infant has pain or not, as it cannot speak, will never be known. Hippocrates, perhaps, was correct when he said that the gums itched; and this may account for the relief apparently obtained from rubbing the gums. Many physicians maintain that salivation has no connection with the teeth, it being a physiologic process appearing from two to three months before the eruption of the first teeth, and ceasing about the twelfth month of life, before dentition is completed. However this may be, it is certainly most active when the teeth first begin to cut the gums. Why may it not be but another expression of the general hyperesthesia and activity of the alimentary tract present during dentition? That the mild catarrhal stomatitis, so frequently present, is the cause of the pain (if there be any), irritability, sleeplessness, salivation and anorexia can scarcely be doubted. The graver forms of stomatitis encountered during teething certainly have no direct connection with that process, being of bacterial origin.

I have never been able to convince myself of the presence of a tooth cough, *i.e.*, a reflex cough associated with teething. The catarrhal affections of the respiratory tract occurring during dentition are purely incidental, and it is significant that they usually disappear or do not occur during the warm season. In addition, we must exclude adenoids, enlarged tonsils and bronchial lymph nodes, before attributing a reflex cough to teething. At the same time, some children suffer with coryza each time a tooth comes through; with this there may be slight trachitis and cough. The bronchitis and cough from clothes dampened by excessive salivation are, I believe, purely imaginary.

Fever is a symptom occasionally seen during dentition. Tooth-fever is less frequent now that we have learned that many of the obscure febrile movements of early life are due to otitis, pyelitis, or pneumonia. Still, increased temperatures (101°-105° F.) are observed, which must be referred to reflex irritation evoked by the cutting of a tooth, since they subside as the tooth escapes from the gums, and are repeated when a new tooth approaches the surface. In the absence of any other factor to explain them, it appears as reasonable to ascribe these febrile movements to dentition as to such indefinite conditions as auto- or alimentary intoxication, as is commonly done.

Digestive disturbances, such as diarrhea, vomiting, anorexia and, particularly, the inability to digest a properly prepared food that formerly caused no trouble (a condition also noted by C. H. Dunn), are quite common during the cutting of the teeth. Is there any connection between the two conditions? I confess that this phase of the subject is fraught with difficulties. Most of these disturbances occur in summer, when nutritional disorders are prevalent, and at an age when dietetic errors are common. Hence, they may be readily explained without resorting to dentition. On the other hand, they occur more frequently during the period of teething than before or after; and numerous observers, the writer among them, have seen them subside so frequently with the cutting of a tooth that the connection appears to be irrefutable. Probably the hyperesthetic condition of the alimentary canal, already referred to, makes the infant susceptible to influences not ordinarily operative. We know, too, that nervous diarrhea occurs. *At the same time, it cannot be emphasized too strongly that no more disastrous doctrine exists than that diarrhea is due to teething; the expense, sickness and death that have resulted from this belief are sad to contemplate.* It is unnecessary to remind this audience that the majority of intestinal disorders of infancy have quite a different origin, and demand prompt treatment.

Rotch insists that otalgia, and even otitis media, are among the most important of the dentition reflexes. He refers this to the connection of the infantile dental nerve with the otic ganglion. Although having no personal acquaintance with such a condition (and otalgia must be difficult to recognize in an infant), the possibility cannot be denied; and it may be one of the sources of restlessness in teething infants. It is difficult to conceive, however, how actual otitis can arise from such a source. Every inflammation of the middle ear that I have encountered in infancy could be traced to previous or co-existent catarrhal, inflammatory or obstructive lesions in the nasopharynx.

Under the head of the nervous derangements of dentition are included sleeplessness, restlessness or general irritability and convulsions. The first three are obviously largely the result of the local conditions in the mouth. Of the possibility of teething as a cause of convulsions in healthy infants, I am very skeptical. At any rate, a direct connection is difficult to establish, and other causes are not readily excluded. Those who reject the doctrine of morbid dentition contend that convulsions are seen only in rachitic children, or in those that, according to the most recent conception, are subjects of the spasmophilic tendency. It is easy to conceive, however, that in spasmophilic infants convulsions might be induced by the additional irritation of dentition. Holt, in his latest utterance upon the question (*loc. cit.*), concedes that convulsions may be produced by teething, although very rarely. He states that he has seen but one case that could be fairly traced to this cause. Convulsions are so common in early life from gastrointestinal, toxic and other causes, that one should be very sure of his ground before ascribing them to teething.

Most dermatologists and many other physicians place eczema among the reflex disorders of dentition. It occurs in children of the so-called exudative diathesis, and often persists long after primary dentition is completed; so that it is hazardous for a physician to predict its disappearance with the cessation of this process. In many instances, therefore, its prevalence during teething is but a coincidence. Nevertheless, the frequency with which it begins about the sixth month, and ceases with the completion of dentition, and the fact that eczema is essentially a catarrhal inflammation of the skin, make it at least probable that as the skin and mucous membranes are analogous organs, the simultaneous appearance of eczema and dentition may be in line with the well-known hyperesthetic state of the intestinal tract at this time. My own belief, while acknowledging other etiologic factors (dietetic errors, constitutional predisposition, etc.), is that dentition is at least one of the contributing causes of eczema.

No discussion of this subject would be complete without a reference to gum-lancing. It cannot be denied that this practice has been, and is now being, employed altogether too indiscriminately. It is also not devoid of danger; serious hemorrhage has followed it, and the open wound that it produces is liable to infection from the numerous bacteria that infest the mouth. It should not, therefore, be practised indiscriminately and without definite indications. Notwithstanding this, however, I am convinced that lancing in the proper way and at the proper moment is highly beneficial, frequently relieving in a surprising way the symptoms for which it is performed. The time of its performance is important. I have never seen any advantage accrue from it when the tooth was deep down in the gum, and when the overlying structures were not in some degree swollen. The proper time to lance is when the gum is swollen, whether hot and red or not, and when the tooth is comparatively near the surface. The incision should be made down to the tooth itself, and should be followed by a boric-acid douche of the mouth. The barbarous advice to remove an elliptical piece of gum is mentioned only for condemnation. The operation may be repeated upon the same tooth, but not indefinitely so; indeed, when it is properly performed, at the proper time, repetition is never called for.

In what manner gum-lancing relieves is not so easy to explain as its performance. Partly, it may be conjectured, it acts after the same manner as any other local blood-letting, but other factors must be considered. As already explained, there is no question of the pressure, in the ordinary sense; yet the local blood-letting may, in some way, relieve irritation about the tooth-roots. In the present state of our knowledge, the good following this practice may be explained in the words of Louis Starr, in the footnote to F. Forchheimer's very able, but antagonistic, article in "The American Text-Book of Diseases of Children," viz., "Experience, the crucial test, has abundantly demonstrated its utility." (It seems scarcely necessary here to warn against incising the swollen, hemorrhagic gums of scurvy, under the impression that the condition is due to dentition.)

I very much fear that these remarks have lost much of whatever force they may possess by the desultory manner in which they have been presented. Ideas have been jotted down, not in any logical order, but as they arose in the writer's mind, and may be summed up as follows:—

(1) Modern scientific methods of investigation have materially lessened the number of morbid symptoms that may be attributed to teething.

(2) It seems impossible for an impartial observer to deny that definite deviations from the normal are frequently associated in a direct causal manner with teething.

(3) It is not the only physiologic process attended with discomfort, pain and pathologic disturbances, even of grave import.

(4) Without enumerating these in detail, the arguments adduced by those opposed to the doctrine of a morbid dentition, although, perhaps, not always to be met by replies altogether satisfactory, are, when this is the case, sufficiently answered by the firm conviction, based upon clinical experience, of numerous able observers.

(5) Many of the symptoms frequently ascribed to teething are purely incidental, and may readily be explained in other ways.

(6) The symptoms directly associated with dentition are

local and reflex, and include local signs in the mouth, disturbances of digestion, fever, perhaps otalgia, but never otitis; certain nervous disturbances, largely dependent upon the mouth-conditions, and, very doubtfully, convulsions, and, finally, eczema.

(7) Gum-lancing, when judiciously performed, has a beneficial effect in relieving the symptoms of morbid dentition.

(8) The greatest care should always be exercised in excluding all other causes before connecting any symptom or set of symptoms with the cutting of the teeth.

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Pneumonia and Status Lymphaticus.—C. McNeil and J. P. McGowan (*Edinburgh Medical Journal,* 1913, N.S. X, p. 201) have studied a series of eleven outbreaks of febrile illness occurring within as many years in a boys' industrial school near Edinburgh. None of the administrative and teaching staffs were affected. Among the boys there were 20 cases of short, acute and rapidly fatal illness; 51 of pneumonia of peculiar and irregular character; and 175 of an uncomplicated but severe febrile attack. The writers state that these cases of febrile illness are cases of pneumonia; fulminant in those acutely fatal; irregular (apparently lobular) in the group designated pneumonia; and abortive or latent in the third group. Pneumococci and blood-stained sputum were obtained from cases in each group during life; and pneumococci were cultivated from the lungs after death in the fatal cases. Of the 20 fulminant cases, 12 died within a day and all within two days from the onset, and autopsies were held upon 14. In a significant proportion of the autopsies various lymph-glandular tissues of the body were noted as enlarged, and in 4 out of 5 cases where the condition of the thymus was recorded this organ was hypertrophied. The writers advance the hypothesis that the rapidly fatal cases were examples of pneumonia occurring in boys in whom the morbid diathesis termed status lymphaticus was present. Status lymphaticus has hitherto been commonly associated only with cases of death occurring suddenly from a variety of trivial and insufficient causes. If the writers' conclusions are correct the term must be enlarged to cover rapidly fatal cases of infectious disease, usually termed fulminant, including such cases of pneumonia, of scarlet fever, of diphtheria, and probably of other infectious diseases.

ENURESIS AND CHRONIC DIGESTIVE DISTURBANCES.*

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When it can be justly said of a diseased condition that a physician's reputation is more often lost than won in its treatment, one is doubtless justified in assuming that comparatively little is as yet known as to its etiology.

It is no doubt true that involuntary passage of urine is due either to increased irritability of the bladder, or to diminished tone of the sphincter, influenced by increased excitability of the lumbar center, or interference with normal brain control. It is with the underlying cause of this excitability, or inhibition, that this paper hopes to deal.

That reflex irritation is of importance in the production of the symptom is evidenced by the not infrequent cures following the removal of these sources of irritation. Circumcision, or the relief of an adherent clitoris, undoubtedly relieves some cases, as does also the repair of an anal fissure, or the removal of a rectal polyp. The removal of adenoids is frequently followed by a cure. These same local conditions, however, occur with even more frequency in children who are not bed-wetters, and the frequent failure following treatment directed toward these lesions must make us exceedingly sceptical as to their very great etiologic importance.

Leonard Williams believes that adenoids and enuresis are associated only because they are due to an underlying cause which he considers to be thyroid insufficiency. He was led to the use of thyroid in the treatment of incontinence by noting aggravation after the removal of adenoids from a child in whom the adenoids were supposed to be the cause. The argument was that the adenoid hypertrophy was, in all probability, compensatory for the deficiency of lymphatic substance elsewhere. The thyroid gland was chosen to supply the supposed deficient internal secretion. Undoubtedly Dr. Williams has had many successes with this line of treatment. In my own experience, however, thyroid has more often failed than succeeded, and a search of the literature fails to reveal any startling results. Thyroid improves the general tone, probably through augmentation of an individually deficient gland, and the atrophy of hypertrophied lymphatic tissue during administration of thyroid must, to anyone who has seen it occur, be considered as sufficient evidence of the relationship of the thyroid gland to the lymphatic tissues. On the other hand, if we consider hypertrophied tonsils and adenoids as part of a general catarrh of the alimentary tract, the relief afforded by the removal of these deformities may fairly be considered to be due to its effect upon the gastrointestinal condition and the subsequent improvement in the general health.

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*Read at the Annual Meeting of the New York State Medical Society, April 30, 1913.

With the exception of a comparatively small number of cases in which an extreme state of acidity or alkalinity may act as a direct irritant to the bladder wall, cases in which evidences of a true cystitis are found and the exceedingly rare cases of diabetes in childhood, the infrequency with which changes in the urine are found apparently warrant a certain disregard of the irritating properties of the urine in the production of the incontinence.

Whether we attribute the condition to local reflex disturbances or to changes in the urine, or whether we believe it to be due to thyroid insufficiency, to deficiency in the suprarenals, or, as suggested by Mello-Leitao, that the enuresis is sometimes caused by an alteration of the hormone of the kidney, it seems fair to consider these factors as more direct and exciting causes and to look deeper for the underlying cause of the excessive response of the nervous and muscular mechanism and for the derangement or poor development of the organs accused.

Since the functional nervous disorders of childhood so often apparently depend upon chronic digestive disturbances, the histories and symptomatology of more than 50 children, subjects of incontinence, were studied with a view to determining to what degree disturbances of the digestive tract might be held responsible for the development of the symptom. The dietetic histories invariably gave ample reason for suspecting the alimentary tract. Practically, without exception, gross errors in feeding were noted, these errors often dating from early infancy. Of 34 children who gave a history of having been nursed, 20 had been allowed to remain at the breast for abnormally long periods, 15 of these had been nursed for a year or longer, some as long as eighteen months. Prolonged nursing certainly predisposes to poor digestive development and, consequently, to digestive disturbances in later childhood. Fischl, in Pfaundler and Schlossmann's "Diseases of Children," says that chronic disturbances of digestion in older children begin usually in infancy, dating from malnutrition, or due to residual weakness of digestion. The more frequent later dietetic errors appeared to be in the direction of sweets and starches. A few were possibly excessive milk-drinkers, suggesting the type of intestinal toxemia upon which Kerley lays so much stress. It is with some hesitancy that the incontinence in these cases is attributed to the effect of the diet upon the digestive organs and through them the production of toxemia, since the diuretic effect of a milk diet might be considered in itself a sufficient cause. Possibly it would be more fair to include only those cases in which the finding of large amounts of indican in the urine justifies the diagnosis of a toxemia of this nature.

Starch excesses are common, undoubtedly because of the ease with which starchy foods may be obtained; this is especially true of the cereals, crackers and bread. Excesses in the so-called uncooked cereals are especially common. Meat excesses were not frequent. Irregular feeding and between-meals feeding apparently played a most important part.

Practically all the patients showed symptoms common to gastroenterics, symptoms attributable to the diseased condition of the digestive tract, including loss or perversion of the appetite, constipation, diarrhea and acute bilious upsets occurring at varying intervals, and colicy abdominal pains were noted. The tongues showed, as a rule, the gray, thin slimy coat of catarrhal conditions, the so-called geographical tongue of gastric catarrh also occurring in several instances. Again, symptoms due to the interference with digestion and assimilation of food, including poor physical development, muscular weaknesses, tendency to colds, wasting and anemia, were common. Profound or restless sleep, with or without night terrors, nervous symptoms, usually attributed, by the laity at least, to worms, chorea, mental torpor, to which may be attributed the lack of brain control, rough and irritable skin and general muscular and joint pains, were among the symptoms apparently due to toxemia. Still discusses the occurrence of enuresis in rheumatic children and says that he has noted the association sufficiently frequently to make him always watchful for rheumatism in the child with enuresis. He also says that the rheumatic child is peculiarly apt to be a nervous child, and that herein may be the connection. It seems just to assume that both the nervousness and the rheumatism are manifestations of intestinal toxemia. As other arguments in favor of the intestinal tract as the seat of the underlying cause may be suggested the frequent occurrence of enuresis after the acute catarrhal diseases and the relapses occurring during acute digestive upsets.

With the exception of Eustace Smith, who, in his "Wasting Diseases of Children," speaks of nocturnal incontinence as a not infrequent symptom of mucous disease, the writers of text-books have apparently given comparatively little attention to the part played by the digestive tract in the production of enuresis, and to the possibilities of treatment directed toward the improvement of the digestive process. Dietetic treatment is advised, but apparently, in most instances, with the idea of changing the composition of the urine rather than increasing general muscular and nerve tone, and the prevention of toxemia. Jacoby, however, speaks of a general anemia and muscular debility, which indicate a diet carefully selected for its nutritiousness and digestibility, and Kerr of a malnourished state of the nerves, increasing reflex irritability and decreasing inhibitory control. Sutherland, in his "Treatment of Diseases in Children," says that in many cases of enuresis it will be found that the child has been systematically over-fed or improperly fed, but attributes the trouble not so much to the material as to the quantity of the food, and West draws attention to the fact that in the majority of cases, so long as the affection is recent, a connection may be clearly traced between it and gastrointestinal disorders, but aside from these few references most of the authors, in speaking of treatment, advise merely a simple, non-stimulating diet with limitation of the amount of nitrogenous food and sugar, and a light, dry supper with the avoidance of stimulants.

In the light of my experience, such advice seems, at the most, inadequate, and there is some question as to the advisability of a dry supper, which would tend to make the urine more concentrated. That concentration, however, is not a marked factor might be suggested by the frequent improvement during hot weather, when more fluids are eliminated through other channels, the improvement in hot weather arguing in favor of the catarrhal conditions which are more prevalent during the cold season. In the *British Medical Journal* of 1906, Lewis advises ascertaining among other things whether or not intestinal asepsis is a prominent feature, and if so, whether or not the urine passed at night is abnormally acid or decreased in quantity, of low specific gravity, etc. He says of this class of cases that they can be easily dealt with and cured by means of a proper diet.

In speaking of the digestive tract as a factor in the production of incontinence, I purposely omitted reflex irritation arising in the bowel. Fecal masses of chronic constipation may act in this manner, as may also the various intestinal worms. Still has found threadworms so frequently present that he thinks it is often wise, even when their presence is denied, to give one dose of santonin with calomel to make this point certain. That a round worm in the bowel may act reflexly upon the mechanism of urination is evidenced by a case of my own, in which the passage of a worm relieved a long-standing suppression. But besides a reflex action, both fecal masses and parasites undoubtedly produce local irritation productive of catarrhal conditions.

The belief then that the disturbances of digestive functions play an important rôle in the causation of enuresis other than through the production of changes in the urine is based upon the following facts, brought out by the study of my series of cases.

The symptom occurs at an age when gastrointestinal disorders are most common, and productive of most nervous symptoms. The dietetic histories of the children showed invariably gross errors, principally excesses in starches and sweets. The incontinence practically always occurred along with other functional nervous disorders, or with local digestive symptoms, or with a poorly-nourished state and anemia. The frequent occurrence of adenoids may, I think, be justly considered part of the digestive catarrh, and the relapses occurring during and after the catarrhal diseases, together with the relapses following grosser dietetic errors and during acute digestive upsets must be considered incriminating.

The treatment, then, based upon this theory as to causation, must be that of the gastrointestinal condition.

A definite number of meals daily, given with absolute regularity to establish a regular digestive habit, and separated by an interval long enough to ensure complete digestion and the establishment of an appetite.

Absolute abstinence from food between meals, nothing but water being allowed.

A mixed diet containing green vegetables to stimulate peristalsis, thereby insuring regularity of the bowels and the avoidance of stagnation, the factor in the production of fermentation products. The diet should be based upon the history of particular excesses and upon a study of the bowel movements to determine what particular food stuffs are at fault.

Proper and thorough mastication.

The establishment of good hygiene.

Medical treatment is practically limited to the use (temporary only) of laxatives and intestinal antiseptics. Later, and only after a normal digestion is established, some easily assimilable preparation of iron may be administered to combat the anemia, and sedatives may be temporarily given early in the treatment to control the bladder.

Local irritations may, of course, be treated surgically.

A fair percentage of cures by this method has made me exceedingly enthusiastic.

111 Union Street.

APPLICATION OF RADIOLOGY TO THE STUDY OF DISEASES OF INFANTS.—G. Variot (*Ann. de Méd. et Chir. Inf.*, January 1, 1913) discusses the various organs, the condition of which can be diagnosticated by means of the X-rays. They may be used in the diagnosis of pneumonia and bronchopneumonia of infants and to map out the area of the heart in the normal and pathologic condition both with the child on the back and on the side. In general this method of examination is very useful in infants, since its results are at the same time precise and rapid, and allow us to appreciate instantly the condition of the organs. Placed before the fluoroscopic screen the infant is even more transparent than the adult, for his body is less thick, especially the abdomen. The child may be placed undressed on a flat surface, and fixed there by a suspensory arrangement, so that the board may be placed vertically in front of the screen. This position is perfectly comfortable for the baby, which can eat and drink in this position, and the movements of the organs be seen during the process. In the condition of hypotrophy the child has the age of his stature. This condition is seen in tuberculosis, or with rachitis. In exploration of the thymus the X-rays have been of the greatest value, since this gland intercepts the rays in a characteristic and special manner.

SOCIETY REPORTS.

THE PHILADELPHIA PEDIATRIC SOCIETY.

April 8, 1913

THEODORE LE BOUTILLIER, M.D., PRESIDENT.

HYDROCEPHALUS.

DR. JOHN SPEESE showed a case of hydrocephalus of extreme degree. The child had a small spina bifida; one month after birth the head began to enlarge; at two months it measured 60 cm. in circumference, with fontanels widely open and superficial veins greatly distended. Some enlargement of the spina bifida was noticed, with constant oozing of cerebrospinal fluid since. Both legs are paralyzed, with absent reflexes. The general nutrition of the child is excellent. There is no history of syphilis in either parent. The hydrocephalus is to be explained by the possible prenatal closure of a foramen, since the spina bifida was already one congenital defect. The degree of the hydrocephalus was so great as to exclude any thought of operation.

DR. LE BOUTILLIER spoke of a baby, not so young as this, who was apparently normal until five months old. At seven months the head measured 23 inches. The baby died at nine months.

CEREBELLAR HEMORRHAGE.

DR. LE BOUTILLIER showed a girl of five years, who had fallen ten days before being observed. Family and previous history are both negative. Five days afterward she developed staggering gait, which became progressively worse, until she could neither walk nor stand alone. Movements of the hands are also incoördinate; there are jerking movements of the head and at times slight nystagmus. When lying quietly in bed all movements cease; but when she tries to sit up all movements are marked. Reflexes are lost, except for an occasional slight knee-jerk on the right. Nose, throat, ear and eye examinations were negative. X-ray pictures also showed no shadows. The diagnosis has been given as hemorrhage into the cerebellum.

SARCOMA OF THE KIDNEY.

Dr. **Warren Walker**, by invitation, showed the specimen of a hypernephroma, removed from a child of two years. Seven weeks before operation the mother first noticed bloody urine; then scanty urination and a tumor, which was freely movable and not painful. Cystoscope showed no urine passing from the left ureter. The child has recovered since.

THE HISTOLOGY OF URTICARIA PIGMENTOSA.

Dr. **Frank Crozer Knowles** reported 5 cases in detail, with a thorough review of the subject. The characteristic features and diagnostic picture were clearly demonstrated in one case. The basal cell layer showed a marked amount of pigment. The corium exhibited large quantities of mast-cells, arranged in a columnar manner and in dense groups. Numerous mast-cells were also found around the blood vessels and lymph channels, surrounding the sebaceous and sweat glands. The theories of the origin of these cells and of urticaria pigmentosa were covered, and photographs of patients and of the histologic features were shown.

Dr. **E. F. Corson** said that this was, in the majority of cases, a disease of early childhood. It is not common, and must be distinguished from simple urticaria, which is due to indiscretion in diet, drugs, etc. The lesions of pigmented urticaria, on the contrary, remain usually for a number of years. Glandular enlargement is not uncommon. While it may resemble xanthoma the locality in which the lesions are found is different. Besides, rubbing the lesion causes the production of a wheal. Treatment is of little avail in pigmented urticaria. Even the X-ray is of doubtful value.

THE BACILLUS BULGARICUS IN GASTROENTERITIS AND ILEOCOLITIS.

Dr. **John F. Sinclair** described 32 cases of acute gastroenteritis and ileocolitis, treated by tablets containing the bacillus lactis bulgaricus. Their ages varied from seventeen days to two years; 20 were gastroenteritis and 12 ileocolitis. Eleven of these babies died; 6 of them with ileocolitis. The cases of gastroenteritis had normal stools within five days on the average; only 7 of the ileocolitis cases cleared up and showed normal stools. Nine days was the average time required. Sixteen cases showed an average loss in weight of 8⅞ ounces, while 12 cases showed an average gain of 6¼ ounces by the end of the first week. Practically all who recovered showed a gratifying gain in weight upon discharge. The feedings were individualized to suit the babies. An initial dose of castor oil was given in every case. These tablets of the bacillus bulgaricus, while not specific, are of distinct service in controlling the putrefactive process in the intestines, thus established a normal condition of the stool. (Paper in full on p. 529.)

Dr. D. J. Milton Miller, of Atlantic City, N. J., said that he was very skeptical about the results obtained both by Dr. Clock and Dr. Sinclair. Dr. Clock did not stop feeding milk at all; though Dr. Sinclair did for a day or two. Dr. Sinclair reported 25 per cent. mortality, while Dr. Clock had had universal success. Dr. Miller protested against the immediate use and unreasonable endorsement of untried, new remedies. If anyone thing has reduced infant mortality it is the comparatively recent practice of cutting off the food at once. This method has not been employed more than ten or fifteen years. Dr. Miller confessed having attempted to use these tablets in 2 chronic cases without much success. Buttermilk may be of great value in some of these cases, especially long-standing chronic or subacute cases of colitis with sour, fermented stools. In such he had used freshly-prepared home-made buttermilk heated to 170°F.

Dr. Seilikovitch remarked that both these tablets and buttermilk may be of great value in some cases, but not in every case.

Dr. Le Boutillier said that he had tried these tablets upon babies with fermentative diarrhea. While a large percentage improved, some failed to improve and several relapsed.

Dr. Sinclair called attention to the fact that all of Dr. Clock's 22 cases had occurred in private practice and were surrounded by all possible advantages. While he did not consider the tablets a specific at all, they apparently did good in a large number of cases, when the food had been stopped for twenty-four hours or longer.

RENAL TUMORS IN CHILDHOOD.

Dr. Emery Marvel, of Atlantic City, N. J., reported the case of a child of twenty-seven months, with an abdominal tumor. Four months later it was operated upon, four days after being brought to the physician for the first time. The right kidney, enclosing the tumor, was removed, weighing 4½ pounds. The patient recovered promptly; but now, three months after the operation, the child is apparently dying from a large tumor of the liver. While not especially rare, renal tumors are not common in childhood. Practically all solid tumors are malignant. They most probably rise from rests of vestigial embryonal structures. Without operation, the prognosis is certain death. Authenticated recovery after removal has been frequently reported in recent years, notably by Robert Abbe. The immediate removal of the tumor is our only hope; procrastination invites hopelessness.

Dr. L. F. Stewart, by invitation, described the tumor. The major portion consisted of loose, connective tissue network. Running through this are strands of cells closely resembling typical fibrous connective tissue, but with larger, longer and narrower nuclei. On staining they are recognized as striated muscle fibers more or less embryonic in character. Then there were clusters of round-cell sarcoma cells. The tumor belongs to the group called myosarcoma. The presence of several distinct tissue types would lead to the opinion that it is a teratoma, with very limited differentiation and a malignant tendency.

PRECOCIOUS DEVELOPMENT OF THE EXTERNAL GENITALIA DUE TO HYPERNEPHROMA.

Dr. H. D. Jump, with Dr. H. Beates, Jr., and Dr. W. W. Babcock, by invitation, reported this case in a girl of seven years, who had shown the growth of hair on the pubis at one year. She developed bodily very early, and at the age of seven there was profuse growth on the pubis, in the axillæ, on the chin and upper lip. The skin of abdomen and legs was rough, there was acne on the face, but without pigmentation. She was mentally precocious, and remarkably strong. Her voice was coarse and deep. She was affectionate, played with dolls, but preferred to give rather than receive caresses. At the age of seven an abdominal tumor was found in the right hypochondriac region, with no enlargement of the superficial lymph glands. The clitoris was an inch long, half an inch in diameter, notched on the under surface, suggesting hypospadias. At operation an enormous perivascular and adherent hypernephroma of the right kidney was removed, with death three hours after operation. The tumor occupied nearly the entire abdominal cavity. Uterus and ovaries were infantile. Left kidney and adrenal appeared normal. The lungs showed moderate metastasis. The microscope showed hypernephroma with much tissue of the type of the adrenal cortex. No adrenal body was found. Dr. Jump reviewed the 17 other cases previously reported. Fourteen of these 18 cases were girls. We can differentiate these cases from true sexual precocity in girls by the presence in the latter of menstruation, enlargement of breasts and retention of female characters; from similar conditions in boys by the development of penis and testes. All 18 cases died before the sixteenth year. With this syndrome there is presumptive evidence of hypernephroma of the adrenal cortex; exploratory operation should be done early, even before a tumor is palpable; with a tumor, its removal is imperative.

DR. MILLER admitted that, when he had shown his case ten years ago, he had had no knowledge of the connection between sexual abnormalities and the adrenals. His case died at two years—one year after he had shown her to the Society. If the changes in the adrenal cortex begin early in intrauterine life, the child is born a so-called hermaphrodite and is usually a female, with enlarged clitoris and empty scrotum. If they begin late in intrauterine life the clitoris is large and there is hair on the pubis. Dr. Marvel's case was probably a girl, though the family have evidently considered her a boy.

DR. MARVEL stated that Dr. Jump was present when he operated and inquired if it were possible to determine whether the tumor was associated with the adrenal or with any sex deformity. There was marked defect in the development of the genitalia, as shown in the photograph. As surgical interference is the only hope in these cases, immediate removal of the tumor is indicated.

DR. JUMP said that he could not be sure whether the tumor developed from the adrenal tissue itself or from adrenal rests in the kidney.

CURRENT LITERATURE.

Abstracts in this Number by
Dr. S. W. Thurber. Dr. Jerome S. Leopold.
Dr. Charles E. Farr.

DISEASES OF EAR, NOSE AND THROAT.

Freedman, Louis M.: On the Function of the Tonsils. (*Annals of Otology, Rhinology and Laryngology,* March, 1913, p. 186.)

The various theories on this subject are each taken up and discussed and the author's conclusions drawn therefrom. Falk holds that the tonsils are residual, embryonic remains, because they are markedly developed in intrauterine life and after birth tend to disappear. Harrison Allen holds that the tonsils are of the thymus, lymph gland and bone marrow type and take on their development when these other so-called glands drop their function. Wood considers them lymphocyte-forming organs. Others think they secrete a digestive ferment. The author has experimented with their extracts in relation to effects on blood pressure and has obtained negative results. Ashhurst holds that the tonsil is a protective organ by a sort of elimination. Stoehr also believes that they show a constant outflow of leukocytes through their epithelium, but Brieger showed that it was not leukocytes but lymphocytes that wandered forth from the tonsils. Goodale experimented with the absorptive power for foreign bodies, such as suspension of dyes, and showed their absorption for these, but not for bacteria. Schoeneman considers the tonsil a lymph gland like all the others, with its main function that of drainage. Jonathan Wright thinks that in our civilized life and its calls upon the vasomotor system by reason of sudden changes in and out heated houses, there is a response in greater cellular activity which often results in hypertrophy of lymph tissue.

There is truth in many of these theories; it is evident that the tonsil is a lymphoid structure; its period of activity is only during the early years; it plays some part in blood building, but not very important; by reason of its leukocytes it is somewhat of a protective organ; it may be called "the sentinel of the body." Tonsils attempt to overcome infection and suffer not from the bacteria, but from their toxins; when this protective office is weakened by inflammations it becomes an obstacle rather than a defence; it is not a portal for infection more than any other part of the body, except by reason of its position. Much is brought to it that escapes other regions; its removal does not remove from the body any organ or tissue absolutely essential to the system, but this removal, if not diseased, leaves the body with one or two less defenses. S. W. THURBER.

MEDICINE.

GOTZKY: CLINICAL SIGNIFICANCE OF ENLARGEMENT OF THE EPITROCHLEAR LYMPH NODES. (*Zeits. für Kinderhk.*, May, 1913.)

After a careful examination of the epitrochlear nodes of 647 children, Gotzky found enlargements in 113 cases, 86 bilateral, 27 unilateral. In the bilateral cases Gotzky believes the enlargement due, in the great majority of cases, to syphilis, while in the unilateral cases this is rarely true. The real cause in the latter cases is hard to determine. Ricketts and status lymphaticus are not etiological factors of any importance, but tuberculosis is occasionally the underlying cause. CHARLES E. FARR.

ROSENSTERN, IWAN: DEBILITAS CONGENITA AND TETANY. (*Zeits. für Kinderhk.*, June 5, 1913, p. 171.)

Rosenstern tested the electrical irritability in 38 congenitally weak infants during the course of six months and found an increased electrical irritability in 76 per cent. of this class of cases. Among normal infants Escherich found this condition in only 3.6 per cent., while in artificially-fed infants Finkelstein found it in 55.7 per cent. of his cases. This clearly shows that congenitally weak infants (prematures, twins, etc.) show an increased electrical reaction. JEROME S. LEOPOLD.

ROSENSTERN, IWAN: SPASMOPHILIC DIATHESIS. (*Zeits. für Kinderhk.*, June 5, 1913, p. 167.)

Rosenstern, writing from Finkelstein's clinic in Berlin, calls attention to the fact that it has generally been supposed that in

Tetany the Erbs phenomenon (increased electrical irritability) was usually the first appearing sign of this condition. Then in order came an increased mechanical irritability and then other symptoms as convulsions and laryngospasm. Rosenstern has tested the electrical irritability in many infants under eight weeks and has shown that in very young infants at least Erb's phenomenon may be absent and convulsions and laryngospasm may be present. JEROME S. LEOPOLD.

SURGERY.

BALAS, D.: ABDOMINAL OPERATIONS ON CHILDREN. (BEDEUTUNG CHIRURGISCHER EINGRIFFE IN DER BAUCHHÖHLE BEI KINDERN.) (*Beiträg. zur Klin. Chirurg.*, April, 1913.)

Balas emphasizes the wonderful recuperative powers of children after abdominal operations as compared with adults, but warns against prolonged operations. Children withstand shock very poorly and therefore loss of blood, exposure of the intestines, and prolonged anesthesia must be avoided so far as possible. Diagnosis is of the utmost importance and is not easy, especially in young children. For example, the onset of pneumonia and acute appendicitis is very similar in many cases. In pneumonia, however, the abdominal facial expression is lacking, the tongue is clean, the respirations are more rapid, and the abdominal tenderness, while present, is superficial and disappears on deep, steady pressure. Rectal examination is also of great assistance, if, as so often happens, the appendix lies in the true pelvis. Intussusception may be diagnosed by the movable mass, the absence of rigidity, and the passage of bloody mucus. Balas differs from the majority of American surgeons in that he believes in flushing the peritoneal cavity with saline, to counteract shock and sepsis. Drainage, also, is most important and should be more abundant than in adults, because of their lessened resistance. In tuberculous peritonitis the most favorable cases are those with effusion, and the benefit of the operation is due, in large measure, to the active hyperemia which follows the exposure of the intestines to the air. CHARLES E. FARR.

ARCHIVES OF PEDIATRICS

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EDITORIAL.

DISAPPEARING DISEASES.

All good doctors are working to eliminate disease—*and* themselves, though there need be little fear that we shall cease to be a necessary evil (as many would have it) for some time to come. Still, in certain of the ancient strongholds the garrisons have capitulated long since, and viewing the ruins of their broken ramparts, we can gain an idea of the fearsome enemies our predecessors had to fight. Dr. Guilfoy, of the New York City Department of Health, has an interesting paper with the above title in one of the issues of the Department's *Monthly Bulletin*. He calls attention to the extent to which certain diseases have yielded to the increased efficiency of sanitary work.

Small-pox, which was such a scourge a hundred and fifty years ago that Dr. Johnson wrote a famous couplet about it, and a certain English town clerk is reputed to have classified his fellow-townsmen in respect to it by putting their names down in parallel columns headed respectively "Have Had" and "To Have," now is such a rarity that some of us have never even seen a case. In the first decade of which there are records in New York, it killed 66 out of every 100,000 of the population. Even after vaccination was made free in 1875, the following decade showed 247 deaths per 100,000 population, while during the last decade less than 1 person out of every 100,000 died from this ancient scourge.

In 1866 there was a severe epidemic of cholera in the city and 1,137 deaths. There had been epidemics in 1832, 1849 and 1854, with death rolls of 3,513, 5,071 and 2,509. In the forty years from 1870 to 1910 there were 25 deaths as contrasted with 9,474 in the thirty years previous, while from 1880 to 1890 and from 1900 to 1910 there were no deaths from cholera, although elsewhere throughout the world cholera raged and ships from cholera-infested countries have continually entered our port.

Yellow fever, in this latitude, is obsolete. Yet this port had visitations of yellow fever in times past, some epidemics reaching the aggregate of 700 odd cases. Typhus fever has not caused a death in New York City in the last ten years, and since its importation from Hamburg, in 1892, when 144 residents of the city were infected, there has been no true case reported, except in the endemic form of Brill's disease, kept alive by the omnipresent body louse.

While typhoid fever cannot be said to have yielded and to have marched out of its fortifications in surrender, yet the ceaseless attack on dirty milk, infected water, the filthy house fly, and the occasional carrier has changed its mortality statistics appreciably. From 1866 to 1877 the rate was 31 per 100,000 of population. From 1908 to 1912 it was 11, a decrease of 65 per cent. And with preventive inoculation it should fall lower still.

The death rate from diphtheria and croup prior to the introduction of antitoxin amounted to 267 per 100,000. The 1908-1912 rate was 32, a reduction of almost 80 per cent. Whether this may be bettered will depend upon the degree of efficiency which is developed in detecting and isolating or curing carriers, and in the earlier administration of antitoxin.

General sanitary measures are responsible for the lowering of the rates of malaria and scarlet fever, the former from 26 per 100,000 to .7; the latter from 91 to 18.

That diarrheal diseases of infancy can come under this class of disappearing diseases is shown by the lowering of the death rate from 30 out of every 1,000 children under five years of age to 10, a decrease of 67 per cent. This has been due in large measure to the work of the Department along the line of securing better milk for the city, in more rigid inspection and the pasteurization of all but the best grades. It has been also due to the work of various child welfare agencies, which have aimed to educate mothers in the care of their children, a work now very happily correlated by the Division of Child Hygiene under Dr. S. J. Baker. It is interesting to gather from another *Monthly Bulletin* certain facts in regard to general infant mortality, of which, of course, diarrheal diseases contribute a large part. In 1911 there was a marked decrease in the number of deaths under one year in New York, due, in large part, to the active campaign for the establishment of milk stations, which radiated information and help, as well as distributing milk. In 1912 the work was continued under the Department, and there were even fewer deaths under one year of age than in 1911, the lowest death rate for this age in the history of the city being reached and a decrease accomplished twice as great as the decrease in the rest of the State. Further, the excessive infant mortality of summer was reduced to a notable degree. Usually the curve of mortality would rise abruptly during the months of June, July and August, resuming a level with the coming of colder weather. In 1911 this rise was not more than half as great as usual, and in 1912 it was hardly any higher than the average during the winter months up to within three years ago.

Such results cost—in money and in effort—but they save that most precious asset of a commonwealth, so often held cheapest—*human*, and especially *child, life*.

All these facts go to make incontestable the dictum: *"Public health is purchasable. Within natural limitations a community can determine its own death rate."* New York City is doing it.

ORIGINAL COMMUNICATIONS.

SOME FALLACIES REGARDING THE TREATMENT OF TUBERCULOUS ADENITIS.*

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Some five or six years ago I presented a study of the subject of tuberculous adenitis in childhood, and I had fancied at that time that surgeons at last had reached a more or less common footing in the treatment of this extremely common and very important malady. The technic which had been elaborated after years of study, had reached, it seemed to me, the point where the results spoke for themselves, and it remained for the surgeons to convince their more or less conservative medical consultants, and through them the laity, that operation offered the safest and best means of a permanent cure of this condition. My hopes in this direction, I am free to confess, have been blighted, and to-day we are still, to some extent, on the defensive in certain quarters in regard to the operative treatment of tuberculous glands. Not only is there an atmosphere of skepticism on the part of the laity, but, what is much worse, we find among some surgeons a criticism of radical treatment and a tendency to return to conservative measures. In other words, there is a willingness to disregard the proofs of the value of operation collected by careful investigators and to attempt to supplant the knife by newer and more fashionable therapeutic agents, or by a reversion to the oldest and most conservative measures.

Proofs of this attitude are easily attainable. Within a few months, while glancing through the pages of the *Journal of the American Medical Association,* my attention was attracted to a gem of therapeutic counsel in that column devoted to the inquiries of subscribers seeking the light through letters addressed to the editor. In answer to a question as to the treatment of tuberculous cervical glands, the advice was given to institute general and, no doubt valuable, hygienic measures, and to continue these with some local treatment until the glands suppurated, when they could be incised and curetted. Shades of Dowd, Wolgemuth and Von Noorden! That our leading journal should disregard the researches of these and other men of large experience, and counsel a return to a method of treatment which has been shown to be attended by the development of tuberculosis elsewhere in nearly 30 per cent. of cases, to say nothing of the prolonged suppuration and local disfigurement attendant upon the treatment advised, when by thorough removal by any competent surgeon 90 per cent. of patients can be permanently cured. I was strongly tempted to write an expostulatory letter to the eminent editor of the *Journal*, but desisted.

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* Read at the meeting of the Philadelphia Pediatric Society.

This advice would mean a turning back to methods which were considered proper some twenty years ago, but there are other and newer methods of treatment which have strenuous advocates to-day, and which are recommended as worthy to supplant operative treatment in the majority of instances, and among these I would especially mention X-ray and tuberculin therapy. Very recently my soul was much vexed by an article by a warm friend of mine, in the *Pennsylvania State Medical Journal,* in which, while describing the great and, indeed, unfailing success which had attended the use of the X-ray in his hands in the treatment of tuberculous cervical adenitis, Dorrance dismissed the operative treatment as follows: "That surgery falls short of what one desires is shown by the number of persons who, after several operations, each one registered by an unsightly scar, still present enlarged cervical glands. On examining patients that have had one or two operations, one frequently finds one or more muscles paralyzed and cutaneous areas with impaired sensation. On account of the large number of recurrences, and the general want of success attending operations, radical surgical operation has fallen into disuse."

If this quotation is not sufficient to demonstrate what I mean, I may quote again by hearsay, the remark attributed to one of our most eminent Philadelphia surgeons, namely, that "it is well to collect one's fee quickly after operation for glands in the neck." The reason, of course, is not far to seek.

Before discussing the measures which are indicated as beneficial in tuberculous adenitis, it will be of value to review some salient features of the etiology and pathology of this condition, and I would remark that it is of the external groups, and especially those of the neck, that I am speaking. Tuberculosis of the glands of the thorax and abdominal cavity is not, generally speaking, amenable to surgical treatment, except in isolated instances, and, as a rule, other measures are to be recommended. Tuberculous glands are occasionally removed from the peritoneal cavity during the performance of laparotomy for various conditions, but deliberately planned operations for their removal are seldom attempted. But cervical adenitis constitutes from 88 to 93 per cent. of the cases encountered surgically. The superficial glands of the neck are arranged in a collar around its upper part, and this collar is sub-divided into groups of suboccipital, mastoid, parotid and subparotid, submaxillary, submental and retropharyngeal glands. These glands drain the region of the scalp, the skin of the face, the eyes, nose, ear, mouth and pharynx with their mucous linings, and, in turn, drain into the deep or descending cervical chain lying beneath the sternocleidomastoid muscle and around the internal jugular vein. This chain extends downward to the posterior border of the muscle, and thence into the supraclavicular triangle below. It also drains the lymphatics from the tongue, palate, esophagus and thyroid gland and empties on the right side into the internal jugular or subclavian vein and on the left side into the thoracic duct. It is noteworthy that there is no lymphatic connection with the interior of the skull, and it is still more important from the standpoint of prognosis and treatment that there is no direct communication with the mediastinal glands or with the lymphatic system of the thorax.

The opportunities for a primary tuberculous infection of these glands are numerous and widespread. While there is some difference of opinion as to the most common avenue of entrance, it is fairly well accepted that the pharyngeal and faucial tonsils and the teeth are the usual sites of infection. Patches of eczema, cracks and sores at the junction of skin and mucosa, the conjunctiva, the various parts of the buccal and pharyngeal regions make easy the opportunity for invasion of the tubercle bacillus. The lymphatic drainage of the faucial and pharyngeal tonsils has been carefully worked out by Dr. Geo. B. Wood, and the drainage of these organs into the cervical glands below and behind the angle of the jaw and beneath the upper portion of the sternocleidomastoid muscle has been clearly shown. Infection from the teeth travels by way of the submaxillary glands. It is the almost invariable rule that it is the glands in the upper portion of the neck which enlarge first, and that the infection travels from above downward. In only 4 of the 649 cases reported by Judd, of Rochester, were the supraclavicular glands first involved, and in these cases the infection evidently travelled upward from the axilla.

After enlargement of these upper cervical glands has appeared, the disease may take one of two courses, as demonstrated by Dowd, who is the most eminent authority in this country on this subject. In children the upper nodes usually break down before the lower nodes are extensively involved, and a definite clinical picture is thus established, especially between the ages of two and seventeen. In adult life, this breaking down is not so prone to occur. The infection tends to spread more rapidly and uniformly to the lower nodes and to involve the greater portion of the chain. The nodes in adults do not have the same tendency to become caseous, but are infiltrated with tuberculosis throughout, the lower being almost or quite as large as the upper, and there is much less tendency to spontaneous limitation of the disease. Under two years of age, the cervical glands are much less frequently attacked, but when they are the prognosis is more serious, as there does not seem to be a great deal of resistance to the disease at this age.

In its passage through the tonsil or around the teeth, the tubercle bacillus may or may not leave evidences of a specific tuberculous infection at its portal of entrance. That the tonsil, when removed, fails to show evidence of tuberculosis, apparently does not mean that it has not been the site of invasion. If the tonsil is not so diseased, then we may speak of the lymphatic gland beyond as the primary seat of infection. In any event, it is involved by direct continuity and not by metastasis from an internal or an irremovable site, and this fact constitutes, to my mind, the strongest argument for operative treatment. If one can, by carefully planned and deliberately executed operation, thoroughly remove a primary lesion, it would seem unnecessary to invoke the other agencies such as the X-ray and tuberculin and to substitute them for a rapid and complete surgical removal. A study of the after history of these cases shows that when untreated, or unsurgically, and I might add, unwisely treated, tuberculosis develops in other regions, while, with radical treatment, according to the methods which have been employed for years by mature and experienced surgeons, having under their control and observation large series of cases, experience has shown, as Hodge says, that almost no other serious infection yields more satisfactory results.

In children, from 70 to 90 per cent. of cases are cured, as shown by Dowd in a study of several hundred cases, and this is contrasted with 24 per cent. of cases which recover without operation. While the results are usually considered, and justly so, to be less favorable in adults, the study of 649 cases reported by Judd, of Rochester, showed only 28 deaths from tuberculosis, including pulmonary cases, after operation, and no operative mortality *per se*.

In the face of these results the criticisms which have been directed against the operative treatment would seem to be unfounded. We are dealing, in the majority of instances, with a primary lesion, and, like primary tuberculosis elsewhere, as, for example, in the kidney, one which permits of eradication, and with slight risk. It is true that the operation required is oftentimes a tedious and difficult one. As I have had occasion to remark before there is little to attract the gallery, and it does not appeal to some classes of surgeons as much as it does to others. The field of operation is small. The time consumed in the operation is great. It is an operation which perhaps appeals to operators who were classed by the late Joseph Price as "milk-stool surgeons," because they found it less tiresome to sit than to stand during their prolonged operative procedures. But there is a sense of inward satisfaction that comes with the completion of a well-planned operation of this type, requiring, as it does, an accurate knowledge of anatomy, and the skill and courage to make a complete dissection in relief of a dangerous area. And this sense of satisfaction will make up for the lack of attention of the man who delights, like the ancient gods, in the conspicuous shedding of blood.

We have spoken of the results of the operation, and we might add to the wide experience of others, that our own results have been satisfactory. It is true that secondary operations are occasionally necessary, but the end results in our hands have been good, especially in children. We have repeatedly been impressed by the fact that the existence of tuberculous glands at this age does not seem to argue a greatly increased susceptibility to tuberculosis above the normal, and that when the glands are thoroughly extirpated the health of the patients is greatly improved and they usually become robust and healthy children.

What have the critics of this operation to offer in its place? We have already mentioned the X-ray and tuberculin. In regard to the X-ray it has now been with us for a good while. It is far from my intention to criticise its value in certain maladies, especially those not susceptible of operative removal. But we cannot accept the reporting of a few isolated cases against the long experience of men of mature judgment. As Dr. Chas. H. Frazier emphasizes, many of these reports consist of 2 or 3 cases successfully treated and then with a course of treatment usually extending over months. Even the most optimistic among the advocates of the X-ray mention 12 to 20 treatments in a course extending over at least three months. When failure to cure by X-ray does occur, the subsequent removal of glands is exceedingly difficult, as Wm. J. Taylor pointed out years ago, on account of the density of the periglandular adhesions.

I cannot do better than to summarize the conclusions of Dr. Henry K. Pancoast, himself an X-ray specialist of note, as communicated to Frazier: "Clinical results," says Pancoast, "have by this time demonstrated that the X-rays deserve recognition as a valuable and efficient adjunct to surgery in the treatment of tuberculous adenitis, but certain fundamental facts must be borne in mind. They have no direct bactericidal action on the tubercle bacillis. Their action is an indirect one stimulating the surrounding tissue cells and increasing their nutrition and enabling them to resist or destroy the active pathologic factors. They may hasten the destruction of cells of lowered vitality, and hasten suppuration when caseation has begun. They cannot supplant surgery where surgical measures are indicated, but may be an adjuvant to the latter by simplifying the operation, preventing recurrence or promoting health in suppurating and serious cases, and frequently improving the cosmetic results."

Frazier refers his cases to the X-ray laboratory for treatment after operation to prevent recurrence. This has not been my own practice, and I still feel somewhat as I did five years ago when I protested against the indiscriminate use of a powerful but uncertain agent which, as Edsall claimed at that time, had sometimes a dangerous influence on metabolism which was especially threatening in the case of children, and which would warn against its continued use at this age.

It hardly seems necessary to dwell long upon Bier's hyperemic treatment in connection with glands of the neck. It is certainly to be thought of in connection with persistent sinuses, where the application of a cupping-glass can do no harm and may expedite healing. It is true that Willy Meyer has used it. His method consisted in tying an elastic band around the patient's neck for eleven out of every twelve hours, just tight enough to compress the deep jugular vein but not to annoy the patient, and when fluctuation developed to make a small incision and put on a Bier's cup for twenty-five minutes daily. A ward of children so treated might well represent a visit to a seance in the realms of the old Indian sect of Thugs, who treated their victims along similar lines.

As to tuberculin, it may be that this is a form of therapy which will in time largely supplant surgery in the treatment of tuberculous lesions, and I would therefore speak of it with much respect. That it is a valuable adjuvant to surgical treatment in other tuberculous conditions is beyond dispute. I do not feel that I am competent to do more than quote from the opinions of two or three experts in this line. Bennett would restrict its use to the very early stages of bacillary invasion and to persistent sinuses after operation. B. A. Thomas pointed out several years ago, that it was useless to resort to it where there were tuberculous adenoids and tonsils or extensive pulmonary disease. The best results were obtained in incipient cases; where there was advanced caseation and liquefaction necrosis, tuberculin was contraindicated. He is still of this belief. The duration of treatment is long, the method is expensive. It may prove useful in preventing recurrence in cases where repeated operations have been performed, and sometimes results in apparent arrest, improvement or cure where operations have been impossible or ineffectual. J. B. Hawes, 2d, the director of the tuberculin department in the Massachusetts General Hospital, has published an analysis of 56 cases treated by him, both children and adults included, and some of his results are excellent. He quotes from a large number of authorities who favor, oppose or ignore tuberculin as contrasted with surgical treatment of tuberculous glands, and emphasizes the value of hygienic measures, and attention to the sites of entry of the germ in the mouth and throat. In this respect all will agree with his conclusions, which, while favoring the use of tuberculin, are fair, sober and conservative.

One final objection to operative treatment remains to be mentioned. It has been claimed that by removal of these glands we take from the patient some protecting influence which leaves him more liable to an outbreak of tuberculosis elsewhere. But if what we have said as to the pathological history and primary nature of this infection be true, and if we can trust the deductions by competent observers from the study of long series of cases treated by thorough operation, as to the satisfactory outcome and permanency of cures, this argument would seem to be founded on tradition or on theoretical reasoning of an unsound nature rather than on clinical observation.

PRE-PARALYTIC SYMPTOM OF POLIOMYELITIS.—J. A. Colliver (*Journal of American Medical Association,* 1913, Vol. LX., p. 813) has observed in 16 cases a symptom which he considers characteristic of the pre-paralytic stage of poliomyelitis and which has been mentioned by only a few writers. The symptom is a peculiar twitching, tremulous or convulsive movement of certain groups of muscles lasting from a few seconds to less than a minute. The amplitude of vibration is greater than a tremor, not so constant and long as a convulsion, and more regular than mere twitching, yet it has some elements of all of these. It usually affects a part or whole of one or more limbs, the face or jaw, but it may sometimes affect the whole body. The symptom may easily be overlooked in the beginning, as it usually lasts less than a second, and unless the patient is disturbed does not recur oftener than every hour or so. Later the duration of the spells lengthens to a few seconds, recurring also at shorter intervals. This condition is often accompanied by a peculiar cry similar to the hydrocephalic. At times there is a slight convulsive movement, like a chill, during which time the child is apparently unconscious with eyes set for a few seconds, and then he apparently becomes perfectly normal again. This brief unconsciousness during which the child's eyes are set may occur without noticeable convulsive movements. There may be a twitching of the lips with tongue running in and out and a working of jaw, preceding bulbar cases. The least noise produces in certain cases short series of convulsive movements similar to those in strychnin poisoning, only not so general.

THE COMPARATIVE VALUE OF VARIOUS SUGARS IN THE FEEDING OF INFANTS.*

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While it has been claimed that the addition of carbohydrate to the milk modification used in the artificial feeding of young infants is unnecessary, most pediatrists still believe that such addition is desirable. The dilution necessary to reduce the fat of whole cow's milk to a percentage safe for feeding to very young babies causes such a diminution in the amount of sugar that the food administered must either be lacking in the necessary caloric value, or else be fed in such amounts as to overtax digestion and assimilation, certainly of fat, and probably of protein. The question of the routine employment of relatively large amounts of protein is still an open one, but even those who contend that casein of cow's milk never causes digestive disturbances recognize that carbohydrates, in moderate amounts, not only are easily assimilated and burned, but have an important relation to water retention, to fat utilization, and as nitrogen sparers.[19]

If carbohydrates are of value, what form should we select? These substances may, for our purpose, be grouped into the polysaccharides, of which starch is a representative member; the disaccharides, such as lactose, saccharose and maltose; and the mono-saccharides, dextrose, fructose, galactose, etc. In the normal processes of metabolism it seems that all carbohydrates before utilization must be converted into dextrose.

If poly- and disaccharides must be converted into dextrose, why not spare the digestive power of the infant by furnishing its sugar in the form of dextrose? While dextrose is easily assimilable, the fact that bacteria rapidly ferment it, with the result that a portion is thereby lost, and, what is of even more importance, the formation of irritant fatty acids in excess, renders it unsuitable for routine use in the infant's food.[8] Moreover, it is conceivable that this ready assimilability may be rather a drawback, in that the intermediary metabolism runs the risk of being overwhelmed by the sudden excess of sugar.

If we turn to the other extreme and consider the polysaccharides, we find that these bodies are not liable to bacterial fermentation until they are split up into the simple sugars.[8] This process is such a gradual one that absorption of the sugars usually prevents fermentation to any great extent. Moreover, it has been shown that older views concerning the inability of the newborn infant to digest starch were erroneous, for a diastasic enzyme is present even in intra-uterine life.[11] As a consequence, some authorities recommend the use of cooked starch early in the infant's existence. It seems to be the opinion of most, however, that any considerable amount of starch is almost certain to cause disturbances, so even those who recommend its use, employ, in addition, some disaccharide in order to bring the carbohydrate content of the food up sufficiently high.

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* Read before the Indianapolis Medical Society, March 18, 1913.

As long ago as 1877, Jacobi protested against the addition of lactose to the infant's food. He believed this sugar to be especially liable to split up into the irritant fatty acids, and urged the use of cane sugar and starch decoctions. Cane sugar has rather fallen into disuse of late, however, some considering it inferior to lactose, and nearly all, apparently, believing maltose preferable.

Pure malt sugar or maltose is too expensive to permit of its routine use in feeding. The commercial preparations consist of mixtures of the disaccharide, maltose, with varying amounts of the dextrins, which are polysaccharides, and it seems rational to adopt Leopold's[4] and Southworth's[6] nomenclature, and designate them collectively as the "maltose-dextrin" preparations. It is evident that, strictly speaking, they are not sugars, but for the sake of simplicity they will be spoken of as such. Commercial lactose, on the other hand, consists of one sugar without appreciable admixture of any other substance.

That pediatrists are by no means agreed upon the relative merits of these sugars is shown by referring to some of the standard text-books. Rotch,[21] Holt[12] and Czerny[24] advocate the use of lactose, while Finkelstein and his followers[23] hold that the maltose-dextrin mixtures are preferable. It is of interest briefly to review certain theoretical considerations which have been advanced in favor of the selection of one or the other of these sugars.

Lactose is always present in the breast milk, and is the organic constituent which is nearly constant in its percentage. It is found in the milk of all mammals and can be prepared in a state of purity as regards chemical composition and bacterial contamination. It is slowly fermentable, being broken up in the intestine (or intestinal walls) and so gradually absorbed as to prevent an overwhelming of the intermediary metabolism with the products of its digestion. Few bacteria but those normally present in the intestines of the normal baby can utilize milk sugar, while "many can utilize maltose."[3]

Herter and Kendall[15] have demonstrated the feasibility of altering the character of the intestinal flora by changes in the diet. Moreover, Theobald Smith[10] has shown that the bacilli of tetanus and diphtheria produce more or less toxin, according to the nature of the media upon which they are grown; and Kendall[10] observed a complete change in the biologic activities of the colon bacillus when dextrose was added to the culture medium. Lactose seems to favor the development of bacillus bifidus, the chief organism found in the colon of the normal breast-fed infant, while maltose encourages the growth of bacillus acidophilus, which, "if present in large numbers, is liable to produce an excessive degree of acidity, which may cause irritation of the intestine and an intolerance for sugar." [3]

If such be the case, should we not endeavor to encourage the formation and maintenance of the "normal" intestinal flora, rather than administer such articles of food as are apt to favor the growth of organisms whose activity may give rise to serious disturbances on the part of the host?

In feeding an infant on modified cow's milk, a food is employed which differs in many important particulars from breast milk. Whether we use simple dilutions of whole milk or top-milk mixtures and split proteins, the fact remains that qualitatively the fat and casein are not identical with those present in mother's milk, nor is the proportion of salts the same. Yet thousands of artificially-fed infants have been successfully reared, not only under the observation of competent pediatrists, but by the use of foods of apparently very unsuitable composition. Such an event is due to the ability possessed in a certain degree by the digestive system to adapt itself to artificial conditions; a faculty which has been demonstrated by animal experimentation.[16] Therefore, it may be urged that the mere presence of lactose in breast milk is no sound argument for its use in modified cow's milk. We do not attempt the impossible task of reproducing the infant's natural food, but rather to furnish such nourishment as will enable it to thrive, and it seems quite possible that under the necessarily artificial conditions some other sugar may be more desirable than that present in breast milk.

What is the significance of the bacterial flora present within the intestine? Are we to assume that a certain group of organisms is characteristic for each species of animal, or for each age of man, and that unless a diet suited to the demands of these bacteria is administered, a group of "foreign" bacteria appears, whose activities are fraught with dire consequences to the host? Or, rather, is the nature of the flora conditional only upon the food taken by the host, and the disturbance which occurs due to the fact that excessive amounts of particular food elements are furnished, and the unutilized portion remaining in the intestine is split up into injurious substances?

If the former be the case, it is hard to understand why favorable results are so often secured on foods which must, if Kendall's views be accepted, change the nature of the intestinal flora. Infants have thriven on simple dilutions of whole milk with low sugar; others on top milk mixtures and high sugar. Even more convincing evidence is offered in the reports on the use of "eiweissmilch,"[13] where the protein is often higher than the sugar, and in Holt's[2] "synthetic milk," the protein content of which was often as high as 5 per cent. Nor have Kendall's claims been verified by other investigators. Otaki and Vogt,[18] experimenting on puppies; Friedlander and Greenbaum[7] on marantic infants; Veeder, Kilduffe and Denny[1] on patients with acute gastrointestinal disease; and Wollstein[2] on babies with chronic intestinal indigestion, saw no such marked and striking change as that observed by Kendall. Veeder[1] suggests that the suppression of pernicious bacterial activity was the result and not the cause of his patients' improvement.

Do the maltose-dextrin preparations possess any merits which render them preferable to lactose in feeding infants? If we accept the statements of many that advocate the use of maltose-dextrin, lactose should never be employed, because its assimilation limit is less than one-half that of maltose; because lactose is more apt to cause diarrhea; because maltose-dextrin causes a more rapid gain in weight; and because maltose is more readily assimilable.

A little reflection makes it evident that some enthusiasts are attributing to the commercial preparations all the virtues of pure maltose and, in addition, those due, probably, to the presence of the dextrins. This will be brought out more fully in the consideration of the especial points.

First, in regard to the "assimilation limit." We are told that the assimilation limit for lactose, as determined by Grosz,[14] is from 3.1 to 3.6 grams per kilogram body weight, while the assimilation limit for maltose, according to v. Reuss,[11] is over 7.7

grams. What does this "assimilation limit" mean? A perusal of Grosz's paper shows that his conclusions on this point were drawn from experiments upon 5 healthy and 3 sick infants, eleven to thirty-four days old; and upon 6 children from one to six years old. His procedure was to administer a 25 per cent. solution of lactose in one dose, or, when quite large amounts were given, in two doses within an hour, to breast-fed infants or to older children on simple solid diet. Obviously, the infants were receiving considerable amounts of lactose in the ingested milk. Having learned the amount of milk taken in a series of 13 cases, and assuming a sugar content of 5.91 per cent. for breast milk, Grosz estimates that the infants observed took from 4.7 to 12.5 grams of lactose per kilogram in twenty-four hours without the appearance of lactose in the urine. Consequently, it was necessary, in some cases, to give as much as 16.2 grms. of lactose for every kilogram of body weight before the assimilation limit was over-stepped. But it was found that less than 3.1 grams of milk sugar in 25 per cent. solution at one dose failed to cause lactosuria. Therefore, could it not be assumed that the administration of, say, 3 grams every hour in addition to the sugar present in breast milk would not cause the elimination of lactose in the urine? The clinician is interested in knowing how much lactose he can give safely in twenty-four hours, not how much can be tolerated in concentrated solution by an infant already receiving fully as much as would be given in artificial feeding.

Moreover, what are the consequences of over-stepping the boundary set by the mysterious "assimilation limit"? Lactose appears in the urine, therefore lactose must have been circulating in the blood. But that lactose in the blood is a menace to health and life remains to be proved. Lactosuria frequently occurs in pregnant women, and is, according to Williams,[20] "without significance." Grosz[14] says: "In conclusion I might mention only that after milk-sugar feeding to infants we could perceive absolutely no disturbance on the part of the digestion. The infants gained regularly and the stools passed showed no change in their consistence. . . . Here and there the number of the stools was somewhat increased; in their consistence, however, they were fully normal." Finally, Nothmann[17] has reported that lactose frequently occurs in the urine of premature infants, in spite of which fact the infants show no signs of discomfort, but develop normally.

Apparently, the "assimilation limit" for lactose as determined by Grosz and Nobecourt[22] has no practical importance as regards the rational feeding of milk sugar to normal infants. Considerably more may be split and assimilated than is ever given, and even should the limit be over-stepped, dire consequences do not seem to ensue.

In the normal breast-fed baby, a certain amount of lactose is split up into fatty acids and other substances. This means that a portion is lost so far as the carbohydrate metabolism is concerned, and also that bodies of an irritant nature to the intestine are produced. Normally the irritation is so slight as to do no more than act as a stimulant to peristalsis, but when excessive amounts of lactose are fed, or where a lactose intolerance exists the irritation becomes so pronounced that enteritis and diarrhea are the consequences. It must be remembered, however, that maltose may undergo a similar fermentation, so on theoretical grounds there seems little in favor of the latter so far as regards the production of diarrhea. But, it is urged, there are present, in addition to maltose, the non-fermentable dextrins in commercial maltose-dextrin preparations. The long-established practice of adding barley water to milk modifications containing lactose furnishes non-fermentable polysaccharides, which should be fully as efficient as the dextrin accompanying maltose.

Leopold[25] observed the action of various sugars on young infants and found that lactose was more prone than saccharose to cause diarrhea, while maltose-dextrin rarely produced this disturbance. It is probable that the amounts of the different sugars were the same and that they were administered in the similar concentration in his experiments. His only statement in this respect is: "The sugar was in an amount of 15-30 g. dissolved in 100 c.cm. of distilled water, and given at one time between two feedings in the evening." Granting that, under the conditions present in the experiment, lactose was more prone to cause diarrhea, does this have much bearing on the use of the sugars in feeding? Leopold tells us: "The children's food consisted either of buttermilk *with sugar addition* or in half milk with about 4 per cent. Mehemalzsuppenextrakt or breast and buttermilk was given." Therefore, the infants received nearly 5 per cent. lactose "with sugar addition"; or 2.25 per cent. lactose and 4 per cent. malt extract; or 5 to 6 per cent. lactose. Now, added to this, there is given a considerable amount of lactose in concentrated solution. Small wonder that, under these circumstances, virtues become vices and what, under normal conditions, would be advantageous in lactose becomes, under these palpably artificial conditions, distinctly the reverse.

As regards the gain in weight, that observed shortly after the administration of large amounts of sugar probably depends upon the lessened excretion of water, and is of little importance as to growth and development, though it may be of significance in those instances where previous water loss has been excessive (intoxication). All experiments tend to show that maltose-dextrin acts more efficiently in this respect than does lactose.

The more gradual and steady gain which we generally associate with satisfactory progress, when accompanied by normal stools and signs of content, seems also more satisfactorily secured by use of the malt sugars, if we base our conclusions on the results secured in "difficult feeding cases." Ladd[5] has had occasion to observe this superiority of the maltose-dextrin preparations; and Leopold[4] presents even more striking evidence.

But we should not be too hasty in assuming that, because Ladd's and Leopold's patients gained better on maltose-dextrin than they did on other sugars, lactose and saccharose are no more to be employed. Until quite recently maltose-dextrin preparations were practically unknown, even to most pediatrists in this country. It is reasonable to assume, then, that these children had previously received lactose or saccharose, and had either failed to gain, due to some individual peculiarity, or had acquired a sugar intolerance from receiving excessive amounts. What is more natural than that they should do better on some other sugar?

Maltose may pass directly into the blood stream, and there be split up into its constituent dextrose molecules; maltase, the maltose-splitting enzyme, being present in the blood. Since lactase does not occur in the blood, any unsplit lactose introduced into the circulation as such is incapable of being utilized. This ready assimilability of maltose is occasionally mentioned as a point in favor of the use of maltose-dextrin, but we should not lose sight of two important facts in this connection. The first is the possibility of too rapid absorption being of doubtful value, and the second that the comparatively complex dextrins are present in almost as large amounts as the maltose.

From this brief review it is evident that the question as to the superiority of any one sugar over another for use in infant feeding is by no means definitely settled. During the summer of 1912, at the suggestion and under the direction of Dr. E. M.

Colie, Jr., we had opportunity to use different sugars in feeding infants treated at the Seaside Hospital of St. John's Guild.

The infants observed were either convalescent from more or less severe gastroenteric disturbance (dyspepsia or intoxication), or were suffering from mild, more or less chronic, conditions (chronic intestinal indigestion; "Bilanzstörung" or slight "Dyspepsie"). No normal cases were observed, nor were the cases "selected" for any particular sugar.

Dilutions of whole milk with sterile tap water or barley water (about 1 per cent. starch) constituted the food in the majority of instances. Top milk (7 or 10 per cent. fat) dilutions, whey, whey-cream mixtures, and casein milk were employed, but the inclusion of the cases receiving these latter foods complicates the tables without having any marked influence on the final results. The attempt has been made to give in the tables the points of greatest importance, but it is evident that accuracy has suffered in the process of condensation. The relation of fat and casein was always the same, and the percentage of fat was low, so that figures bearing on these points are omitted. In estimating the sugar percentage and the energy quotient, no attempt has been made to secure absolute accuracy. It was assumed that whole cow's milk contains 4.5 per cent. lactose, and that the addition of 1 ounce of sugar by weight to a total mixture of 100 ounces by volume, increased the sugar by 1 per cent. All calculations were based upon the amount of food ordered, and when the refusal of a portion occurred this was disregarded.

In addition, two other important sources of error must be considered. It is not uncommon to see two apparently normal infants react very differently to the same food, one gaining in a satisfactory manner, while the other fails to gain or suffers serious digestive disturbances. Therefore, it must be remembered that only by the observation of considerable numbers of cases can the error from individual peculiarities of the infants be so diminished as to be unimportant.

If one child is given a food containing 4 per cent. fat, 6 per cent. sugar and 1 per cent. protein, its progress could not be compared with that of a second receiving a food containing 1 per cent fat, 6 per cent. of another sugar, and 3.5 per cent. protein. In the cases reported, however, no such extreme variation in the composition of the food occurred, and they were so grouped that the variations in food offset each other. However, in view of the limited number of cases reported, it must be understood that the evidence presented is by no means conclusive, merely suggestive.

The sugars used were:—

- Commercial lactose
- Commercial saccharose
- Pure maltose
- 80% maltose
  - Maltose, 80%
  - Dextrin, 20%
- Dextri-maltose
  - Maltose, 51%
  - Dextrin, 47%
  - Sodium chloride, 2%
- *Malt soup extract
  - Maltose, 57.57–58.91%
  - Dextrin, 15.42–15.70%

TABLE I.

LACTOSE.

A. Whole Milk Diluted with Water.

Name	Total Sugar Per cent.	Energy Quotient	Weekly Weight Change in Grams	General Condition	Stools
Rich.........	3.75	112	—142	Same	Remain dyspeptic
Romoli......	4.25	137	+471	Improved	Remain normal
Englehart...	4.25	100	+ 84	Improved	Remain dyspeptic
Goldstein....	4.50	128	+ 99	Same	Remain normal
Buckley, 1...	4.50	101	+ 88	Same	Remain normal
Crowe.......	4.50	136	+ 28	Worse	Worse
Bargolla.....	5.00	122	+248	Same	Worse
Costello	5.50	176	0	Same	Worse
Empanella, 1	6.00	134	—154	Worse	Worse
Empanella, 2	6.00	173	—357	Same	Worse
Buckley, 2...	6.00	115	+ 66	Same	Remain dyspeptic
Shade	6.00	106	— 26	Worse	Worse
Summerville	6.00	118	+231	Same	Remain dyspeptic
Rossello, 1...	6.00	167	+ 30	Same	Improved
Barron, 1....	6.00	82	—110	Same	Improved
Barron, 2....	6.00	124	+463	Improved	Improved
Barron, 3....	6.00	146	—520	Worse	Worse
Hensley	6.00	136	+ 25	Same	Remain normal
Heisler, 1....	6.00	104	- 198	Worse	Worse
Heisler, 2	6.00	100	+ 64	Improved	Improved
Westphal....	6.00	128	+ 10	Same	Remain dyspeptic
Rosello, 2....	6.00	210	- 377	Worse	Worse
Finnegan, 1..	6.00	109	+265	Improved	Improved
Finnegan, 2..	6.00	106	— 44	Same	Remain normal
Corina... ...	6.00	118	—794	Same	Improved
Rosello, 3....	6.00	169	+419	Improved	Improved
			Gained 15—57.69% Same 1— 3.84% Lost 10 38.45%	Improved 6 23.07% Same 14—53.8 % Worse 6 23.07%	Improved 7—26.9% Same 10—38.4% Worse 9—34.7%
Average......	5.55	129	- 131		

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* The composition of the malt soup extract is not definitely fixed. The manufacturers say that each lot is made in the same manner and no considerable variations should occur. The manufacturers of Dextri-Maltose, on the contrary, standardize their product.

B. Whole Milk Diluted with Barley Water.

Rosello......	2.25	143	+ 87	Improved	Improved
White........	4.50	96	- 418	Worse	Worse
Westphal....	4.50	109	–165	Worse	Worse
Mullen.......	4.50	41	–397	Improved	Improved
Crawford	4.50	115	595	Same	Remain dyspeptic
Corina, 1.	5.50	149	+497	Improved	Improved
Corina, 2......	5.50	134	– 28	Same	Remain normal
			Gained 2–28.57%	Improved 3–42.8%	Improved 3 - 42.8%
			Lost 5–71.43%	Same 2–28 57%	Same 2–28.57%
				Worse 2–28.57%	Worse 2–28.57%
Average	4.46	112	–145		

TABLE II.

SACCHAROSE.

Whole Milk Diluted with Barley Water.

Name	Lactose Per cent.	Total Sugar Per cent.	Energy Quotient	Weekly Weight Change in Grams	General Condition	Stools
Corina, 1.	3.40	5.00	101	529	Same	Worse
Corina, 2..	3.40	5.00	98	+397	Same	Remain normal
Miller, M.	2.25	6.00	197	– 65	Same	Remain normal
Miller, A..	2.25	6.00	164	– 99	Same	Remain dyspeptic
Hensley ..	5.30	7.30	182	+198	Same	Worse
					Improved 0	Improved 0
					Same 5 100%	Same 3–60%
					Worse 0	Worse 2–40%
Average...	3.32	5.86	148	– 98		

TABLE III.

PURE MALTOSE.

A. Whole Milk Diluted with Water.

Name	Lactose Per cent.	Total Sugar Per cent.	Energy Quotient	Weekly Weight Change in Grams	General Condition	Stools
Empanella, 1.	1.30	3.80	180	0	Same	Remain constipated
Empanella, 2.	2.70	7.70	236	+536	Improved	Improved
Solomon	2.25	6.25	151	– 57	Same	Remain constipated
				Gained 1—33.3%	Imp. 1–33.3%	Improved 1–33.3%
				Same 1—33.3%	Same 2–66.3%	Same 2—66.3%
				Lost 1–33.3%	Worse 0	Worse 0
Average	2.08	5.91	189	+153		

B. Whole Milk Diluted with Barley Water.

Goldstein, 1..	2.25	4.00	161	0	Same	Remain constipated
Goldstein, 2..	2.25	5.30	180	+ 50	Same	Remain constipated
				Gained 1—50%	Imp. 0	Improved 0
				Same 1—50%	Same 2–100%	Same 2—100%
					Worse 0	Worse 0
Average	2.25	4.65	170	+ 25		

TABLE IV.

80% MALTOSE.

A. Whole Milk Diluted with Water.

Name	Lactose Per cent.	Total Sugar Per cent.	Energy Quotient	Weekly Weight Change in Grams	General Condition	Stools
Finnegan.....	2.25	3.75	143	- 19	Worse	Worse
Rich..........	2.25	3.75	118	+ 6.6	Worse	Worse
Goldstein.....	2.25	4.25	130	0	Same	Remain constipated
Stessel........	2.25	4.25	140	+ 1.61	Improved	Remain normal
Bargolla......	3.00	5.00	122	+57	Same	Worse
				Gained 3—60% Same 1–20% Lost 1–20%	Improved 1 20% Same 2—40% Worse 2—40%	Improved 0 Same 2- 40% Worse 3–60%
Average	2.40	4.20	131	+41		

B. Whole Milk Diluted with Barley Water.

Name	Lactose Per cent.	Total Sugar Per cent.	Energy Quotient	Weekly Weight Change in Grams	General Condition	Stools
Crawford	2.25	3.80	100	– 80	Same	Remain normal
Fisces	3.90	6.00	138	+368	Same	Worse
				Gained 1—50% Lost 1—50%	Imp. 0 Same 2 - 100% Worse 0	Improved 0 Same 1 50% Worse 1—50%
Average	3.07	4.90	119	+144		

TABLE V.

DEXTRI-MALTOSE.

A. Whole Milk Diluted with Water.

Name	Lactose Per cent.	Total Sugar Per cent.	Energy Quotient	Weekly Weight Change in Grams	General Condition	Stools
Costello	1.70	3.20	126	0	Same	Worse
Romoli	2.25	4.00	130	— 42	Same	Worse
Hensley	1.60	6.00	120	+397	Same	Remain normal
Empanella ...	1.80	6.80	192	+331	Worse	Worse
O'Malley	2.00	7.00	168	+227	Improved	Remain dyspeptic
Galato, 1	6.00	11.00	269	— 20	Same	Worse
Galato, 2.......	6.00	11.00	279	+139	Improved	Improved
				Gained 4—57.14% Same 1—14.29% Lost 2—28.57%	Imp. 2—28.57% Same 4—57.14% Worse 1–14.28%	Improved 1—14.28% Same 2—28.57% Worse 4—57.14%
Average	3.05	7.00	183	+147		

B. Whole Milk Diluted with Barley Water.

Name	Lactose Per cent.	Total Sugar Per cent.	Energy Quotient	Weekly Weight Change in Grams	General Condition	Stools
Goldstein.....	2.25	3.25	141	— 49	Same	Remain constipated
Koch	1.50	3.50	119	—178	Same	Remain normal
Crawford	2.25	3.75	107	+ 99	Improved	Remain normal
Schmidt.......	2.25	3.80	118	—207	Same	Remain normal
Miller, M......	6.00	7.60	195	— 37	Worse	Worse
				Gained 1—20% Same 0 Lost 4—80%	Improved 1–20% Same 3–60% Worse 1—20%	Improved 0 Same 4—80% Worse 1—20%
Average	2.85	4.38	136	- 372		

TABLE VI.

MALT-SOUP EXTRACT.

A. Whole Milk Diluted with Water.

Name	Lactose Per cent.	Total Sugar Per cent.	Energy Quotient	Weekly Weight Change in Grams	General Condition	Stools
Rosello, 1.....	2.25	3.25	147	+694	Improved	Remain normal
Logan........	2.25	4.25	75	+496	Improved	Remain dyspeptic
McCarthy	6.00	7.00	204	+172	Improved	Remain normal
Heisler.	6.00	7.00	186	+112	Same	Become dyspeptic
Rosello, 2.....	6.00	8.40	188	+ 79	Improved	Remain same
Barron........	6.00	9.00	182	—313	Worse	Become dyspeptic
Summerville .	6.00	9.00	144	— 71	Worse	Become worse
Barron........	6.00	9.00	230	+213	Improved	Improved
Schosi........	6.00	10.00	193	+164	Improved	Remain normal
Schosi........	6.00	10.00	199	+ 79	Same	Remain normal
				Gained 8 - 80% Same 0 Lost 2 - 20%	Improved 6 - 60% Same 2 - 20% Worse 2 - 20%	Improved 1 - 10% Same 6 - 60% Worse 3 - 30%
Average	5.25	7.69	175	+162		

B. Whole Milk Diluted with Barley Water.

Hitchings	1.9	4.00	170	—174	Worse	Same
Stessel, 1.....	2.25	4.25	141	+ 79	Improved	Improved
Galato........	2.25	4.75	179	+ 99	Improved	Remain normal
Stessel, 2.....	3.4	7.4	226	+694	Worse	Become dyspeptic
Miller, A......	6.00	7.6	202	+ 21	Improved	Remain dyspeptic
Mullen	6.00	8.00	89	+263	improved	Remain normal
Barron........	6.00	9.00	172	+127	Worse	Remain dyspeptic
				Gained 6—85.72% Same 0 Lost 1—14.28%	Imp. 4 57.14% Same 0 Worse 3—42.85%	Improved 1—14 28% Same 5 - 28.56% Worse 1—14.28%
Average	3.97	6.42	168	+158		

If the results secured by the addition of lactose to the milk modifications are examined, it is seen that the use of a cereal diluent apparently has a favorable influence if we judge by the character of the stools and the general condition. If, however, the weight change be taken as criterion, it is evident that the reverse is true. It should be noted, however, that the percentage of sugar and the energy quotient are lower for the barley water series than they are for that in which plain water was used as diluent.

Where 80 per cent. maltose was used, there were only 2 cases in which a cereal diluent was employed. So far as the limited number of cases allows a judgment, no appreciable difference existed between the two series. The same may be said in regard to the pure maltose, but in the dextri-maltose series a greater gain occurred where plain water was used as diluent, but the nature of the stools also became worse in a larger number than in those cases where a cereal diluent was used. It is seen, however, that the sugar percentage was quite different in the two series, which might account for both facts. Similar conditions exist in regard to malt extract and the same explanation may be offered.

Apparently the use of a cereal diluent did not exert any very marked influence. Unfortunately, in the saccharose series a cereal diluent was used throughout, so no comparison is available, but assuming that the results would have been the same here as with the other sugars, we may assemble the averages in the following table, grouping together all cases fed any particular sugar, irrespective of the diluent used.

TABLE VII.

	Total Sugar Per cent.	Energy Quotient	Weekly Weight Change in Grams	General Condition	Stools
Lactose.........	5.00	120	—138 Gained 17–51.5% Same 1 3.9% Lost 15—45.4%	 Improved 9 27.27% Same 16–48.42% Worse 8 - 24.24%	 Improved 10—30.30% Same 12 - 36.36% Worse 11—33.33%
Saccharose.....	5.86	148	- 98 Gained 2–40% Same 0 Lost 3—60%	 Improved 0 Same 5 - 100% Worse 0	 Improved 0 Same 3 - 60% Worse 2—40%
80% Maltose...	4.55	125	+92.5 Gained 4 - 57.14% Same 1—14.28% Lost 2—28.57%	 Improved 1—14.25% Same 4—57.14% Worse 2—28.57%	 Improved 0 Same 3—42.86% Worse 4 57.14%
Maltose........	5.28	179	+89 Gained 2—40% Same 2 40% Lost 1—20%	 Improved 1—20% Same 4—80% Worse 0	 Improved 1—20% Same 4—80% Worse 0
Dextri-Maltose.	5.69	159	—112.5 Gained 5—41.66% Same 1— 8.33% Lost 6 50.00%	 Improved 3—25% Same 7—58.33% Worse 2—16.66%	 Improved 1— 8.33% Same 6 -50.00% Worse 5—41.66%
Malt Soup Extract	7.05	171	+144 Gained 14—82.35% Same 0 Lost 3–17.65%	 Improved 10—58.82% Same 2—11.76% Worse 5—29.41%	 Improved 2—11.76% Same 11–64.70% Worse 4—23.52%

So far as the number of cases justifies, certain fairly definite conclusions can be drawn from the results collected in the last table.

One of the most important indications of an infant's satisfactory progress is the weight increase. From the last table it is seen that the greatest sum total weight increase occurred in the series of infants fed on mixtures containing malt-soup extract, while the greatest total loss occurred in the lactose-fed series. An examination of the individual tables shows, however, that some of the infants receiving lactose suffered considerable losses, more than offsetting the moderate gains in a larger number of cases. It is probably fairer to rate the sugars according to the percentage of cases which showed an increase in weight.

Mere increase in weight alone is not a reliable index of progress. When, however, the state of the stools is good and the infant's general condition satisfactory, more trustworthy conclusions may be drawn. If these three factors are considered, the following grouping is possible:—

	Gained in Weight	General Condition Improved	Stools Became Worse
Malt-soup extract ...	82.35%	58.82%	23.52%
Lactose	51.50%	27.27%	33.33%
Dextri-maltose	41.66%	25.00%	41.66%

Thus, it is evident that of the three sugars considered, malt-soup extract was distinctly superior in all three respects, while dextri-maltose is decidedly of less value than lactose. Pure maltose, saccharose, and 80 per cent. maltose cannot be included in the table; for 80 per cent. maltose caused a weight increase superior to that present in the lactose series, but the general condition was improved in less than 15 per cent. of the cases receiving the former sugar and the stools became worse in 57 per cent. of them. Slightly similar conditions exist in regard to pure maltose and saccharose. This is due, in all probability, to the small number of cases studied, so we may dismiss the three latter sugars from consideration until more evidence is forthcoming.

Why should malt-soup extract produce better results than those following the use of the other sugars?

The first possibility is that many of our infants had received sugar injury before coming under observation; and, as has been mentioned, lactose and saccharose are much more commonly used in America, by the laity certainly, in feeding infants. Thus, it is easily understood why a malt sugar would be better utilized than lactose. But the effects following the use of dextri-maltose compel us to discard this explanation as untenable.

It might be supposed that the presence of an alkali in the malt extract exerted an influence, but many of the infants fed upon other sugars received 5, 10 or 15 per cent. lime water.

The protein content of the malt extract present in the milk dilution is so small that it could scarcely be of importance in cases where the milk protein was always high.

The quantity as well as the quality of the food exerts an influence on the weight change. Reference to Table VII. shows that the sugar percentage and the caloric value of the malt soup extract series are higher than in either lactose or dextri-maltose series. This would seem to offer a satisfactory explanation for the weight increase after malt extract, but why did not the dextri-maltose series show to better advantage than did the series receiving lactose? Moreover, the general condition and the stools in the malt extract series are better than in the other two series, which is not compatible with over-feeding.

In conclusion, it must be clearly understood that the evidence presented has no bearing upon the selection of a sugar for feeding "normal" infants. I have seen nothing in the literature to prove nor have we made any observations in support of the contention that the maltose-dextrin mixtures are in any way superior to lactose for addition to the food of the average sound infant. That malt-soup extract is superior to lactose and the latter in turn preferable to dextri-maltose seems indicated by our results, but the small number of cases and the limited time of observation make one hesitate to draw positive conclusions.

It is with pleasure that I acknowledge my obligation to Dr. Colie for the opportunity of reporting our results and also to my associates, Dr. E. J. Healey and Dr. F. H. Carber, who kindly placed at my disposal records of cases under their charge.

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BIBLIOGRAPHY.

1. American Journal Diseases of Children, Vol. IV., No. 2, 1912, p. 75. Veeder, Kilduffe and Denny: "Studies in the Bacteriology of the Acute Intestinal Diseases of Infancy."
2. *Ibid,* No. 5, 1912, p. 265. Holt and Levene: "The Influence of High Protein Feeding on the General Metabolism, on the Intestinal Flora and on the Body Temperature of Infants."
3. American Journal Medical Science, Vol. CXLIV., No. 488, 1912, p. 640. Morse: "Maltose in Infant Feeding."
4. Archives of Pediatrics, Vol. XXVIII., No. 10, 1911, p. 844. Leopold: "Sugars in Infant Feeding with Special Reference to the Maltose-Dextrin Preparations."
5. *Ibid,* Vol. XXIX., No. 5, 1911, p. 324. Ladd. "Studies in the Nutrition and Digestion of Infants."
6. *Ibid,* No. 9, p. 646. Southworth: "The Dextrins and Maltose in Infant Feeding."
7. *Ibid,* p. 673. Friedlander and Greenbaum: "Influence of Food upon Intestinal Flora of Infants."
8. Beibl. zu den Mitteilungen d. Gesch. f. inn. Med. u. Kinderhk. in Wien., Vol. IX., No. 3, 1910, p. 101. Von Reuss: "Die Bedeutung der Kohlehydrate für die Ernährungs-störungen in Säuglingsalter."
9. Berl. Klin. Woch., 1909, p. 965. Weigert on the question as to the value of lactose as addition to milk. Cited by von Reuss.
10. Boston Medical and Surgical Journal, Vol. CLXIV., No. 9, 1911, p. 288. Kendall: "Bacillary Dysentery," etc.
11. *Ibid,* p. 852. Morse and Talbot: "Report on Pediatrics."
12. "Diseases of Infancy and Childhood." L. Emmet Holt.
13. Interstate Medical Journal, Vol. XIX., No. 5, 1912, p. 465. Hempelmann: "Albumin Milk in the Nutritional Disturbances of Infancy."

14. Jahrb. f. Kinderhk., Vol. XXXIV., p. 82. Grosz: "Beobdachtungen über Glykosurie in Säuglingsalter nebst Versuchen über alimentare Glykosurie."
15. Journal of Biologic Chemistry, Vol. V., 1908-1909, p. 293. Herter and Kendall: "An Observation on the Fate of B. Bulgaricus (in Bacillac) in the Digestive Tract of a Monkey."
16. *Ibid*, p. 331. Neilson and Scheele: "The Effect of Diet on the Maltose-Splitting Power of the Saliva." See also:—
    Arch. d. Biol., St. Petersburg, Vol. II., p. 219.
    Biochem. Centralbl., Vol. I., p. 201.
    Zeitschr. f. Physiol. Chem., Vol. XLV., 1908, p. 201.
17. Monats. f. Kinderhk., Vol. VIII., No 7, 1909, p. 377. Nothmann: "Laktase und Zuckerausscheidung bei frühgebornen Sauglingen."
18. *Ibid*, No. 11, 1910, p. 657. Otaki und Vogt: "Darmbakterien und Ernährung."
19. Munch. med. Wochenschr., Vol. LVIII., No. 1, 1912, p. 340. Finkelstein and Meyer: "Zur Technik und Indikation der Ernahrung mit Eiweissmilch."
20. "Obstetrics," J. Whitridge Williams.
21. "Pediatrics," T. M. Rotch.
22. Rev. mens. des Mal. de l'Enf., Vol. XVIII., 1900, p. 161. Nobecourt: "De l'Elimination par les Urines de Quelques Sucres Introduites par la Voie Digestive ou la Voie Sous-Cutanee Chez les Enfants."
23. "Sauglingsernahrung und Sauglingsstoffwechsel." Langstein-Meyer.
24. "The Feeding of Children." Ad. Czerny in "Modern Clinical Medicine."
25. Zeitschr. f. Kinderhk., Vol. I., No. 3, 1910, p. 218. Leopold: "Ueber die Wirkung der Verschiedenen Zeuckerarten bei Ernahrungsgestorten Sauglingen."

PARALYZING DIPHTHERIA.—I. David (*Arch. de Méd. des Enf.*, February, 1913) says that there are some epidemics of diphtheria in which there are more cases of paralysis than is usually the case, and he considers that there is some variation in the toxins of the disease which causes this factor to be prominent. In an epidemic observed by him, the paralysis occurred in adults as well as children in some very severe and even fatal forms. Among the children there were all sorts of motor troubles, whether accompanied by angina or not. Paralysis of the velum and eyelids, strabismus, paralysis of the neck, lower extremities, muscles of respiration, and dorso-lumbar region occurred, but never of the upper extremities. Some of the cases of paralysis were found among the pupils of a girls' school in which all the pupils were examined and cultures from the throats were made. Two pupils had troubles of accommodation and strabismus. One of these had had a diphtheritic angina and had been treated with serum; the other had had an unimportant sore throat. These pupils showed no Klebs-Loeffler bacilli, while seven others who showed no signs had bacilli in the throat. The malignancy of the disease was greatest among the adults, while the majority of patients were children. The author believes that in this epidemic he had to deal with a Klebs-Loeffler bacillus of enfeebled virulence. There were a large number of fibrinous rhinitis cases, of chronic form, combined with an angina. The general symptoms were not marked. Possibly the nasal diphtheria and the paralysis had some relation. A bacillus which had chosen for its habitat the undesirable culture medium found in the nose may have developed in a modified manner.

A NOTE ON BLOOD PRESSURE IN INFANTS, ESPECIALLY IN GASTROENTERITIS.*

BY HOWARD KENNEDY HILL, M.D.,

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So little work on the blood pressure in infants has been reported that it has seemed worth taking the time of the members of the Society to report the result of some findings made upon babies with gastroenteritis in my service at the Babies' Hospital during July, 1912. As some of the members at least know, the babies that are taken to the Babies' Hospital are, in most cases, suffering from the most severe types of gastroenteritis, many of them having ileocolitis, with extreme prostration and markedly toxic. They have been treated in their homes or in dispensaries, and, owing to the unfortunate home conditions in hot, crowded parts of the city and the state of poverty and ignorance of the mothers in many cases, in spite of careful advice and treatment the babies have become steadily worse, and as a last extremity they are taken to Wynnefield. Several babies were admitted in practically a moribund condition, last summer, and some of the recoveries were certainly remarkable.

Owing to the great difficulty in obtaining even approximately accurate estimations upon infants, it is necessary at the outset to agree that attempts to obtain the blood pressure on the arm are futile, and all our readings were therefore made upon the thigh. This attracts less attention than on the arm, and so possibly causes less error from a psychical influence, which unquestionably at times plays a very large part in the blood pressure. Even on the thigh, so many infants measure less than six inches from the anterior superior spine of the ileum to the condyles of the femur that the ordinary cuff when expanded cannot rest upon the entire surface of the leg, and so will not register the correct pressure of the artery along that area. For this reason all our readings were made with the cuff folded exactly in half, and this measurement we may say, when expanded, is about 2¾ inches, or about 6½ centimeters wide. We used the Nicholson sphygmomanometer, a modification of the Riva-Rocci idea, the most convenient, as well as the most accurate, that we have yet met with.

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* Read before the Philadelphia Pediatric Society, May 13, 1913.

The degree of inaccuracies is hard to ascertain, but there is unquestionably some, due partly to muscular contraction in the leg, partly to interference by the condyles of the femur and partly to a slipping downward of the cuff. But I do not believe that this error ever amounts to more than 5 mm., and possibly not more than in adults; certainly not more than in nervous women. The diaper was loosened in all cases.

Auscultation was always employed, rather than relying upon palpation, over the popliteal artery, and this gives a slightly higher reading than some authors have obtained, using the radial pulse by palpation.

The systolic pressure was measured from the first shock or sound heard over the popliteal artery, and the point at which the sound entirely disappears was taken as the diastolic pressure. Since this work, Warfield has described a new method by which the diastolic reading is made upon the disappearance of the second clear sound, which seems to us to be very simple and easy to follow out.

Friedeman, in 1893, as regards the work that has been done on children, found in studying 63 children with diphtheria that when the systolic blood pressure fell below 75 mm. the prognosis was unfavorable and that cases showing a reading of 65 to 60 mm. were almost invariably fatal. He thought that the diagnosis of cardiac involvement and the establishment of convalescence could be made much earlier by the sphygmomanometer than by radical clinical methods.

Biernachi, in 1899, in using a pocket form of Hill and Barnards' instrument, with 26 cases, 6 of which were fatal, found that the incidence and intensity of toxic symptoms bore a distinct relation to the fall of blood pressure. Durand-Viel, in 1903, using Potain's instrument in 55 cases, found that the blood pressure fell in every form of diphtheria, and was relatively more marked in older children and in the more severe forms of the disease.

Denis, in 1903, from observations on 400 children, reached the same conclusion. Weigert, in 1907, with 46 cases, did not think much prognostic value should be attached to sphygmomanometry. In one fatal case of a child two years old the blood pressure became as low as 40 mm. Brückner, in 1909, examining 200 children with diphtheria, using Gaertner's tonometer, found various results, and agrees with Weigert as to the scant value of the estimation of the blood pressure. Rolleston, whose observations were based upon 179 cases, using Martin's modification of Riva-Rocci's sphygmomanometer, reported only the systolic pressure as measured by the reappearance of the radial pulse. As far as possible, the measurements were taken at the same time each day. He, however, among all his cases only studied 6 babies under two years of age.

The average blood pressure among healthy normal children, according to Seiler, using the Riva-Rocci instrument is as follows:—

From children aged two to three years the maximum systolic pressure is from ..	75 to 80
Four to five years	79 to 90
Six to seven years	85 to 95

and so on up to fifteen and sixteen years, from 103 to 120. The results obtained by Cook and Briggs, using their modification of the Riva-Rocci instrument, are slightly higher. In normal children up to two years the blood pressure was 75 to 90 mm. Children over two years from 90 to 110, and young adults 130. In women the blood pressure was 10 to 15 mm. lower than in men. Rolleston, in his 179 cases, found 63, or 35.1 per cent., according to Cook and Briggs' normal average, and 45 cases, or 25.1 per cent., according to Seiler's averages, showing a blood pressure below normal in the second week. The depression showed a distinct relation to the severity of the attack. Among his mild cases, a child aged two years, whose blood pressure was first taken on the sixth day of the diphtheria, was 96 mm., with subsequent readings during the acute stage of 96, 100 and 102. The neurotic element has more to do with the blood pressure in many instances than authors have given credit. In 3 of Rolleston's cases markedly nervous, two sisters of nine and seven years respectively, showed readings which ran between 130 and 148 mm. Hg. for a month, and in a boy aged ten years they ran from 126 to 144 mm. from the twenty-second to the forty-ninth day of his attack of diphtheria.

There seems to be no direct relationship between the blood pressure and the pulse rate, as the pulse rate is much less stable, although the lowest of each occur in diphtheria during the second week. Schoen, of Griesswald, last month in an article on "The Practical Significance of Blood Pressure in Diphtheria," opposes the views of Weigert, Brückner and Rolleston, and believes it to be a diagnostic help, finding in a large number of severe cases a deep and persistent fall of blood pressure, and a fall of the blood pressure after the subsidence of acute symptoms was in many cases the first sign of persistent intoxication, and that the fall of blood pressure was also very frequently followed by severe cardiac disturbances. Bloodgood believes that fear and other mental qualities which go to make up the psychic factor have a great deal to do with shock and blood pressure. He has seen the blood pressure fall from 140 to 80 in ten minutes, in two patients, where all other influences had practically been eliminated.

In infants we believe this fear, especially when the thigh is used, is greatly eliminated, although still certainly present, unless the infant is extremely prostrated. In contrast to these cases, we might mention a few cases cited by Tyrrell, Gray and Parsons. One, a child of seven years, with occasional fits, showed 90 m. A child of eleven and one-half years with uremia, 248 m. An infant two and one-quarter years old with neoplasm of the corpora quadrigemina, the reading being obtained with difficulty, 108 to 115. In this case fright and shock had no influence, and the medulary center undoubtedly was the cause. Another infant, two and one-half years old, suffering from tuberculous meningitis, shortly before death, with "grouped respirations" well marked, gave a systolic blood pressure of 130.

In normal individuals the pressure in the recumbent position is 5 to 10 mm. lower than in the erect position, as pointed out by Janeway and Cook and Briggs. Rolleston found rather the opposite condition in children with diphtheria. He also found this to be so in 80 cases of scarlet fever, and believed it to be the case in convalescence from any acute disease. Oddo and Achard believe this fall to be due to what they termed "The hypotension of effort." In 2 children two years old the blood pressure before tracheotomy was 120 and 110 mm., and immediately after tracheotomy it fell to 82 and 80 mm. respectively. In a baby eleven months old the systolic blood pressure on admission was 118, and a subsequent reading was 80. It was noteworthy among Rolleston's findings that upon the appearance of albuminuria in diphtheria there was a fall in the blood pressure, while in scarlet fever with albuminuria there was a rise in the blood pressure. Rolleston's conclusions were that the estimation of the blood pressure, though of much theoretical interest and of some value, in conjunction with other prognostic signs, is by no means indispensable in forming the prognosis of a case of diphtheria.

It is of interest, in a study of blood pressure, to refer to Rolleston's advocacy of adrenalin in severe diphtheria, following Emile Sargent's doctrine of suprarenal insufficiency, since verified by many French clinicians, notably Netter, Hutinel, Gautier, Moizard and Comby, which accounts for symptoms formerly attributed to cardiac failure, bulbar inhibition or neuritis of the vagus. In 10 of Rolleston's cases the blood pressure was increased by the injection of 10 mm. of the 1 to 1,000 solution every two or four hours, but the remarkable facts noted also, emphasized by Martin and Darre, were that in malignant cases of diphtheria the prostration and asthenia were practically overcome, while the blood pressure was not raised.

Janeway, in his lecture before the Rush Society of the University of Pennsylvania on March 12, 1913, and with Park in 1912, confirming the work of Mayer, showed that contraction occurred in portions of vessels studied not only when dependent on the size of the dose of epinephrin, but also on the state of tonus in which the pieces of blood vessels were at the time.

This may have some bearing upon the toxic condition of the musculature in toxic gastroenteritis and its consequent low blood pressure. Thus an apparent selective action of the epinephrin on certain structures, as in asthma, may be dependent upon their state of tonus.

J. Ross Mackenzie, of Aberdeen, in "Observations on the Use of Saline Solutions in Epidemic Diarrheas," after describing his routine treatment, in reporting his findings concluded:—

First: Collapse in epidemic diarrheas is due to low blood pressure and accumulated toxins.

Second: The results obtained from injecting the fluid are increased blood pressure and the passage of those toxins.

Third: The price of isotonic sea-water plasma prohibits its use among the poorer classes, while in saline solution we have a highly satisfactory substitute.

Fourth: Subcutaneous injections of saline solution should be resorted to in the earliest indications of collapse, and in the case of very young infants at the first visit, whether collapsed or not. He believed that the key to the moribund condition in epidemic diarrheas is anuria, which is caused by the lowering of the general blood pressure, and especially that of the kidneys. Injection of normal salt solution or sea-water plasma raises the blood pressure, and in this way rather than from any isolated single condition of the fluid causes immediate improvement. This, of course, is due to the increased amount of urine at once voided, and so the carrying off of a large amount of accumulated toxins. This routine treatment by Mackenzie was successful in 85 per cent. of his cases. Of interest here is the recent report of 6 cases of urticaria, treated by Dr. Arthur W. Swan with epi nephrin hypodermically, in which, however, if the cause persisted, the wheals returned in from a few hours to a few days. The blood pressure in the children treated rose only temporarily. Gray and Parsons, in their article on "Blood Pressure Variations Associated with the Lumbar Puncture," found:—

First: That in lumbar puncture the puncture of the skin is accompanied by a rise in blood pressure, which varies in extent with the degree of consciousness, the pain, and the disturbances produced by the operation, but not entirely accounted for by these factors. Puncture of the dura mater causes a much larger rise, which is due not to pain or the disturbances produced, but to a definite effect on the vasomotor center.

Secondly: Withdrawal of cerebrospinal fluid tends *per se* to lower the blood pressure, but the net result of lumbar puncture is to raise it for at least twenty minutes afterward. Again, blood pressure records from cases of high spinal anesthesia show at the outset an abnormally high blood pressure due to mental anxiety. Then a rise following lumbar puncture. Next a "preliminary fall," followed by a further more marked "main fall," as the paralysis affects the thorax. Finally, as the paralysis passes off, the blood pressure rises to its original value. Oliver has shown to be false the objection which seems at first sight probable—that the exclusion of so large a portion of the vascular area, as by the Riva-Rocci and all armlet methods, should cause a rise in blood pressure. Gray and Parsons show by their records, in their scientifically careful article, using a modified Gibson apparatus with a graphic drum record running over many minutes, that no rise occurred. With the loose silk bandage instead of the former heavy leather and canvas armlets, provided the width is sufficiently narrow, the rule devised by Von Recklinghausen is still necessary, *i.e.,* the width of the armlet in relation to the circumference of the arm, and must be followed. Frequently estimations of the systolic pressure do not allow enough air to escape from the cuff to obtain a record of diastolic pressure.

In the 25 cases of gastroenteritis studies by us, all in infants under two years, we have had difficulty in arriving at definite conclusions. The number of cases we fully realize to have been too small to assure accuracy. The two tables appended will show, however, a rather higher blood pressure than other authors have claimed, due in part to the narrow cuff used, even compared to Cook and Briggs' normal averages, which were higher than Seiler's. In the infant of three months, the systolic pressure of 95 mm. was 15 mm. above the average for two years. These findings rather disagree with those of J. Ross Mackenzie. We do, however, believe that the pulse pressure, which is the difference between the systolic and diastolic pressures, was less in most of the cases which died, although here, too, there were many exceptions. The pulse pressure has much more significance than the systolic blood pressure alone, a point insisted upon by Nicholson, and is not influenced by the size of the cuff or whether the systolic blood pressure is high or low, but by the relation of the systolic to the diastolic pressure in each case. Our conclusions, we believe, show that blood pressure in infants can never have the same importance that it has in adults, principally because of the absence of arteriosclerosis and its causes, upon which Osler, Russell, Oliver and others have recently written, or even in young children, although the effect of toxicity must surely have great influence upon the blood pressure in infants as well as at any other age of life.

To show the difficulty in estimating the blood pressure in infants, we have included in the tables those cases in which an attempt to obtain a blood pressure was made, but failed, in order to show an approximate percentage, in which it is practically impossible to make at all accurate readings. In closing, I should like to make special mention of Dr. William S. Middleton, at present instructor in medicine in the University of Wisconsin, whose skill as one of the resident physicians at the Babies' Hospital, in taking the blood pressures and in other directions, was marked.

TABLE I.

Ages.	Case No.	Blood Pressure. Systo.	Diast.	Pulse Pressure.	Result.	Stay in Hospital.
(Up to 3 months)						
5 weeks	1	Unable to determine			Died	6 weeks
7 weeks	2	Unable to determine			Died	11 days
3 months	3	95	80	15	Recovered	13 days
(3 to 6 months)						
3 months	4	92	75	17	Recovered	12 days
5 months	5	Unable to determine			Recovered	5 days
5 months	6	Unable to determine			Recovered	....
5 months	7	112	76	36	Died	10 days (Congestion of lungs)
(6 to 9 months)						
6 months	8	95	78	17	Died	2 mos. 1 wk.
6 months	9	On admission				
		98	90	8		
		8 days after				
		98	82	16	Died	7 weeks
6 months	10	Blood pressure not taken			Died	11 days
6 months	11	Blood pressure not taken			Died	Same day
6½ months twins	12	105	88	17	Recovered	11 days
6½ months	13	105	82	23	Recovered	11 days
8 months	14	85	60	25	Recovered	2 months
(9 to 12 months)						
9 months	15	98	82	16	Recovered	2 months
9 months	16	130	118	12	Died	33 days (Broncho-pneumonia)
10 months	17	On admission				
		115	85	30		
		14 days later				
		115	80	35	Recovered	2 months
11 months	18	95	72	23	Died	1 day (Dilatation of the heart and edema of the lungs)
(1 to 2 years)						
12 months	19	100	80	20	Died	9 days
15 months	20	118	82	36	Recovered	14 days
18 months	21	100	78	22	Recovered	2 months

Ages.	Case No.	Blood Pressure. Systo.	Diast.	Pulse Pressure.	Result.	Stay in Hospital.
18 months	22	Upon admission				
		98	80	18		
		8 days later				
		95	80	15	Died	46 days
19 months	23	110	90	20	Recovered	40 days
19 months	24					
25 months	25	Upon admission				
		155	62	93		
		4 days later				
		155	65	90	Recovered	5 days (Loud systol. murmur, not mitral)

TABLE II.

Age.	No. of Cases.	Recovered.	Died.	Breast-fed. Recovered.	Died.	Not Breast-fed. Recovered.	Died.
Up to 3 months	3	1	2	1	..	..	2
3 to 6 months	4	2	2	1	1	..	2
6 to 9 months	8	4	4	3	..	1	4
9 to 12 months	4	2	2	2	2	..	..
1 to 2 years	6	4	2	3	1	1	1

BIBLIOGRAPHY.

Baudoin, A., Thesis de Paris, 1906-1907, No. 344.
Biernacki, J., British Medical Journal, 1899, Vol. II., p. 1787.
Bloodgood, J. C., Progressive Medicine, December, 1912.
Brückner, M., Deut. Med. Woch., 1909, Vol. XXXV., p. 1926.
Comby, J., Archiv. de Med. des Enf., 1911, Vol. XIV., p. 46.
Cook, H. W., and Briggs, J. B., Johns Hopkins Hospital Report, 1903, Vol. XI., p. 451.
Denis, Theses de Paris, 1902-1903, No. 215.
Durand-Viel, P., Theses de Paris, 1902-1903, No. 156.
Friedemann, J. H., Jahrbuch f. Kinderheil., 1893, Vol. XXXVI., p. 40.
Gautier, C. L., Theses de Paris, 1909-1910, No. 464.
Gray and Parsons, Quarterly Journal of Medicine, 1912, Vol. V., No. 19; also Lancet, 1909, Vol. II.; also International Clinics, 1910.
Hutinel, V., Journ. des Practic., 1909, Vol. XXIII., p. 146; also Hutinel's "Malad. des Enf.," Tom. I., 1909, p. 55
Janeway, T. C., "The Clinical Study of Blood Pressure," 1904.
Janeway, T. C., and Park, Journal Experimental Medicine, 1912, Vol. XVI., p. 541.
Kolossova, Jahr. f. Kinderheil., 1902, Vol. VI., p. 759.
Mackenzie, J. Ross, British Journal Children's Diseases, 1912, Vol. IX., p. 343.
Martin, L., and Darre, H., Bull. et Mem. de la Soc. Med. des Hop. de Paris, 1909, Vol. XXVI., pp. 830-1050.
Meyer, Zeitsch. f. Biol., 1906, Vol. XLVIII., p. 351.
Moizard, Jour. de Med. et de Chir. Prat., 1909, Vol. LXXX., p. 881.
Netter, A., Bull. et Mem. de la Soc. Med. des Hop. de Paris, 1909, Vol. XXVII., p. 824.
Nicholson, Percival, Journal American Medical Association, July 9, 1911.
Oddo, 1905, Vol. XXII., p. 371; Comptes Rend. de la Soc. de Biol., 1905, Vol. LVIII., p. 1089.
Oddo and Achard, *Ibid,* Vol. LIX., p. 719.
Oliver, G., "Studies in Blood Pressure," London.
Osler, Sir W., "High Blood Pressure: Its Associations, Advantages and Disadvantages," British Medical Journal, 1912, Vol. II., p. 1173.
Rolleston, J. D., "Practitioner," 1904, Vol. LXXIII., p. 614; *Ibid,* 1909, Vol. LXXXII., p. 110; M. A. B. Reports, 1908, Medical Supplement, p. 273.
Russell, W., Post-graduate Lecture on "Heart Power," and the terms "Blood Pressure, Hypertonus," etc., British Medical Journal, London, 1912, Vol. II., p. 659.
Schoen, C., Deut. Med. Woch., March 27, 1913.
Seiler, Corresp. Blatt. f. Schweiz Aertz, 1910, Vol. XL., p. 433.
Sergent, E., Presse Med., 1902, Vol. X. p. 939; and Bull. et Mem. de la Soc. Med. des Hop. de Paris, 1909, Vol. XXVII., p. 930.
Swan, Arthur W., American Journal Medical Society, March, 1913, Vol. CXLV., No. 3, p. 377.
Weigert, K., Monograph, "Uber das Verhalt Art., Blutdruck," etc.; "Volkmann's Samm. Klin. Vort," No. 459, Series XVI., Heft. 9.

CASE OF PYLORIC STENOSIS UNDER MEDICAL CARE.*

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Arthur L. was born by instrumental means five months ago. He was apparently a normal infant at birth. Breast feeding was started four hours later, being continued more or less regularly every one and one-half hours and whenever he cried.

When three weeks old he was given bottles of diluted milk three times a day in addition to the breast. From this time vomiting began and continued more or less regularly after every feeding. For four weeks various mixtures and methods of feeding were tried, none of which agreed with the baby.

I saw the boy on February 14th, he being seven weeks old; he was much wasted, the skin dry and scurfy, hanging in loose folds on the extremities, pallor was marked, surface of the body was cold, old-man facial expression, respiration shallow, slow and irregular; pulse weak and irregular, temperature, 98°F. The bowels were constipated from birth, and belching was a common symptom, stools when present varied from yellow to black, probably depending on the medicines used. During the examination, vomiting occurred five minutes after a fifteen-minute breast feeding. The milk was curdled and was shot through the nose and mouth. The abdomen was tense and before vomiting a double tumor formation was seen between the umbilicus and the left costal border. Feeding was stopped and 5 grains sodium bicarbonate in 1 ounce water substituted; calomel, grain ⅙, was administered every two hours. This was followed by four bowel movements, three yellow and one green, and slight vomiting twice. He was then allowed breast milk, ʒi in water ℥i, every two hours and the sodium bicarbonate was continued and so did the vomiting. Broth was tried and was also rejected.

The child was in extremis, and I recommended operation as the only hope, but the mother preferred to have the baby die at home. Enteroclysis 1 pint, by the drop method, seemed to revive the baby and was repeated once or twice a day. Hypodermoclysis was employed the next morning and likewise proved beneficial and was repeated every other day.

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* Presented at the meeting of the Philadelphia Pediatric Society, May 13, 1913.

As food, sugar of milk, grs. x in water ℥i, was used every hour. Vomiting ceased, and the bowels moved with each enteroclysis, and three days later whey ʒi was added to each feeding. On February 22d, two days later, another dram of whey was added to the feeding. Hypodermoclysis was employed twice during the week, and enteroclysis by the drop method once a day. Olive oil inunctions (½ ounce) were employed at night. The baby within ten days after treatment was begun was receiving fat by inunction, sugar, proteid and water by the mouth and artificial serum by hypodermoclysis and enteroclysis.

February 24th, whey ℥ss saccharum lactis gr. x, water ʒvi every hour. Tumor visible during ingestion and digestion, gastric peristalsis marked, but no vomiting, and boy seems bright. Stool once a day independent of enteroclysis, color yellow and light green.

March 1st. Two yellow bowel movements, good consistency. Whey ʒvi, water ʒii every hour.

March 8th. Weight with shirt, napkin and socks was 7¾ pounds. Hypodermoclysis discontinued. Enteroclysis every other day. Whey ℥i every hour.

March 14th. Weight 7 pounds, 14 ounces. Constipation for two days. Whey ℥i¼ every hour. Olive oil still rubbed in at night.

March 16th. Vomited several times, abdomen very tense. Whey stopped. Calomel, gr. ⅙ every two hours. Improved immediately and it was noted at this time that calomel always produced a happy result.

March 23d. Whey ℥ss, water ℥ss every hour.

March 30th. Whey ℥i every hour. A dram of mercurial oil (Oleat Hg., ʒi; Ol. olivae, ℥i) was rubbed into the abdomen every night. Enteroclysis twice a week.

April 5th. Looks better, one to three stools daily, good color, does not vomit, tumor and gastric peristalsis persist; evidences of development of salivary glands.

April 14th. Cream (top milk), ʒss, whey ℥i every hour. Mercurial oil rubbed in every night.

April 17th. Left hydrocele developed. Had been restless and crying a great deal. Stools light yellow, two a day.

April 24th. Condition good, treatment continued.

May 1st. Whey ℥iss, cream ʒ¾ every hour.

May 8th. Weight, 9 pounds, 3 ounces; looks bright, skin clear, well nourished. Gastric peristalsis and tumor formation present two or three minutes after feeding, no vomiting, two or three light yellow stools in twenty-four hours, soft. Treatment continued.

This case demonstrates what patience combined with determination can effect. Although the child is by no means rid of pyloric obstruction, still the vomiting and constipation are controlled to such a degree and the weight has increased so rapidly in the last few weeks as to make even the parents who were at first disinclined to carry out the treatment, very hopeful and enthusiastic.

Although no Wassermann test has been made, and although no specific history was obtained, I, nevertheless, feel grateful for the service mercury has rendered me in this case.

A new pattern of intubation apparatus was shown recently in Paris and is described in the *Bull. de la Soc. de Péd.* for June, 1912. The chief advantage in the new instruments seems to be that the introducer is tubular, so that respiration is restored as soon as the tube is in the larynx, before the holder is withdrawn. Moreover, a whistle has been attached to the introducer, so that success is instantly signalled. A further detail is that no thread is necessary, since the attachment of the tube to the tubular mandril is perfectly secure.—*Universal Medical Record.*

To avoid the often disagreeable effects of tincture of iodin in external application, Lemaire strongly recommends applying a 5 per cent. solution of sodium hyposulphite five minutes after the iodin. For operative purposes, solution of sodium hyposulphite must be sterilized and a compress left on for two minutes. All trouble of a drug dermatitis is thus avoided. Sodium hyposulphite is also an antidote in iodin poisoning. (*Gazette Hebdomadaire des Sciences Médicales de Bordeaux,* July 28, 1912.)—*Universal Medical Record.*

REPORT OF A CASE OF HYDROCEPHALUS.*

BY JOHN SPEESE, M.D.,

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A report of the following case is made because of the extensive degree of hydrocephalus present.

The patient, a female aged three months, was admitted to the service of Dr. J. H. Jopson at the Children's Hospital. The father and mother are both living and well; two sisters and one brother are in a normal state of health. There is no history of syphilis, or of a congenital defect in the family.

The child was born at full term by a normal labor, and appeared normal, with the exception of a small spina bifida in the lumbo-sacral region. The mother states that one month after birth the child's head began to enlarge, and that this enlargement has persisted until her admission to the hospital, two months later. Coincidentally with the increase in size of the head the spina bifida enlarged slightly and spinal fluid oozed constantly from the thin membranes which covered it.

The measurements of the head are as follows: Circumference, 60 cm.; from the anterior fontanel to the posterior part of the posterior fontanel, 35 cm.; from one parietal eminence to the opposite, 31 cm.; from the top of one ear to the other, 35 cm.

The lower extremities are completely paralyzed, the reflexes absent, but wasting of the muscles is not noted. The general condition of nutrition is excellent, and the child takes its nourishment without trouble. The Wassermann reaction was negative.

The case belongs to the congenital type of hydrocephalus, the cause of the obstruction being obscure in this instance. Congenital syphilis and rachitis may be associated with the disease, and have been described as the cause in some cases. The subarachnoid spaces form a system of intercommunicating channels and are connected with the ventricles through variously named foramina. The abnormal quantity of fluid causing hydrocephalus may result from a prenatal obstruction caused by inflammation, as is seen occasionally in autopsy cases, by an actual hypersecretion of the choroid plexus and ependyma; it may result from the inability of the lymphatics in the subarachnoid spaces to carry off the excess fluid, or it may be due to diminution in the absorption faculty of the pacchionian bodies and ependyma. While obstructive lesions seem to play the most important rôle in the production of hydrocephalus, it has been claimed by some writers that several factors are active in its production, namely, obstruction, hypersecretion and diminished absorption. It is a well-known fact that hydrocephalus is commonly associated with such congenital defects as cephalocele and spina bifida, and from this fact some observers endeavor to prove that both conditions may have been due to an early disturbance of the cerebrospinal circulation which has prevented the normal closing of the primitive nervous system. This disturbance is not necessarily a permanent one, according to Cushing, and may subside. The cephalocele or spina bifida can be operated upon only when the obstructing lesion has been recovered from.

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* Read before the Philadelphia Pediatric Society, April 8, 1913.

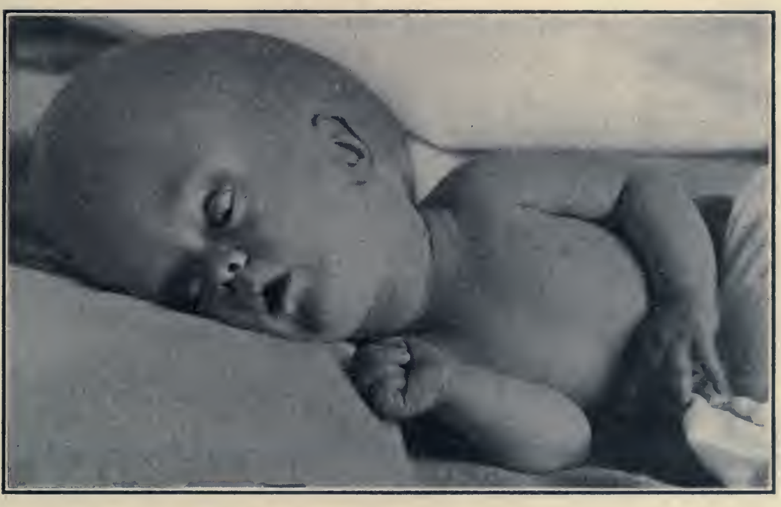

Fig. 1.—Front view of infant, showing large head and staring eyes.

The methods used in the treatment of hydrocephalus have as their object relief of pressure. Lumbar puncture is the easiest means of relieving pressure, and is of course successful only when there is free communication between the ventricles and the cord. Puncture of the lateral ventricles has frequently been employed and seems to relieve the pressure symptoms in rapidly progressing cases. The relief is often but transitory, for the distention appears a few hours after the ventricle has been emptied. The various methods of drainage into the subarachnoid or subdural space or elsewhere have been followed by comparatively little success, as infection or disturbance in intracranial pressure has resulted usually in death a short time after the operation. Cushing has recently described a method of combined laparotomy and laminectomy by which he endeavors to provide drainage into the retroperitoneal space. This method is particularly suitable in cases of hydrocephalus associated with spina bifida, for the radical cure of the latter may be undertaken in conjunction with the establishment of the drainage. This procedure was carried out in 12 cases with a considerable measure of success.

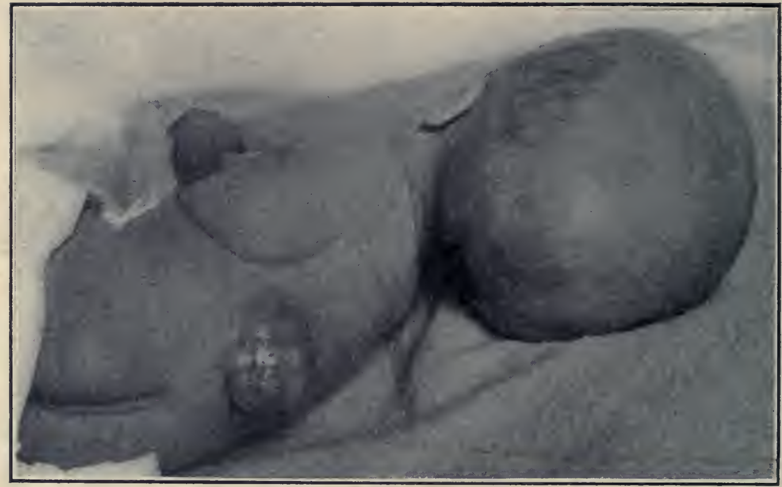

FIG. 2.—Rear view, showing large head and spina bifida.

The treatment by operative measures in such an advanced degree of hydrocephalus as represented by the case reported, seems altogether out of the question. The high degree of pressure has entirely destroyed the cortical centers so that even in the event of relief by repeated tapping, or a spontaneous cessation of the affection, mental development would seem impossible. The prognosis is therefore entirely unfavorable. The employment of some of the measures mentioned in early, mild or chronic cases has occasionally arrested the development of hydrocephalus and has even restored the patients to a normal state of mental activity.

THE NORMAL AND ADVENTITIOUS DANGER PERIODS FOR PULMONARY DISEASE IN CHILDREN.

BY WILLIAM CARLOS WILLIAMS, M.D.,
Medical Inspector of Schools, Rutherford, N. J.

In New Jersey the medical inspector of schools in any given district is asked to measure and record the circumference of the chests and the body length in all children once a year.

This procedure has been held up as a glaring example of the practical uselessness of the entire physical examination, "for," as the parents say, "of what use to my child is a mass of records of chest measurements filed away in a drawer? It would be better to spend the medical inspector's salary on means for improving the system of ventilation."

The parents are quite right as far as the usual hasty measurements now made over clothing are concerned—they are useless. However, in order to be able to give some definite answer to these parents and, if possible, to settle the point in my own mind, I have striven to define some use to which a series of accurate—not inaccurate—measurements of the chest and of the body length could be put.

Turning the problem over in my mind during the regular yearly examination four things become apparent:—

(1) That there is no normal size for the chest in either males or females at any given age; no standard by which a chest of a certain age may be judged and declared to be either larger or smaller than it should be, for at any given age there were chests of great variety as to circumference, all of them, as far as could be told, in healthy individuals. Also, I found that these chests were progressing along parallel developmental lines, one with the other, from year to year, at the same time retaining the original —I am to presume hereditary—circumference in relation to length of body.

(2) That in general there appeared to be a fairly uniform increase in circumference each year for all the chests of the same age, though at certain ages this increase in circumference seemed to be greater than at other ages.

(3) Furthermore, that at a certain age the boys' chests seemed to grow faster than the girls' chests and *vice versa*.

(4) And finally that there was an inverse relation between chest growth and the growth in length of the body, and that in general this was most apparent at one certain age, which differed with the two sexes.

My impression was that there was a period in any child's development when chest growth was at a minimum compared to total growth and that this might be a danger point for pulmonary disease; furthermore, that this period differed in the two sexes. Beside this, I also thought I noticed that in certain individuals of widely differing ages the chest development was decreased below normal for the children of that particular age and that this usually occurred in children who were rapidly gaining in body length—but also in those who were uniformly undeveloped in all parts for the year.

If this were so it would be important to be able to recognize these periods as possible predisposing causes for pulmonary disease. Here was a use to which the accurate statistics could be put in any case.

The first step was to determine the average ratio between development in body length and chest circumference for each succeeding year in the two sexes.

At this time in looking over Dr. Emmet Holt's "Diseases of Childhood," these observations struck me as having an important bearing on the subject:

"The height much more than the weight of a child is governed by hereditary influences." That is, the hereditary height of a child will be attained primarily, the weight secondarily.

"The effect of malnutrition is much less on the length of the body than on the weight." That is, malnutrition will be at the expense of all the rest of the body before height will be affected. This means, after fat, that muscle tissue will suffer before length, the lack of which muscle tissue means, among other things, the lack of proper stimulus to the development of the thoracic bones. The result is a smaller chest relative to height than would be developed if nutrition were normal.

Therefore the height always increases, relatively, at the expense of the chest or as a general principle. Developmentally, length of body is always dominant to weight and, as it seemed to me, chest development.

This, then, would be a constant source of danger and put me strongly on the track of a natural danger period which would more than likely correspond to the period of greatest growth in body length.

But the periods of greatest growth in the two sexes would most likely correspond to the period just before puberty, when the body is preparing itself for the new task. But length being dominant at this time, as at others, it then rushes forward, while for a moment the weight and the chest hesitate before they too rush on and again equalize the ratio. Just at that moment the danger point should be: just before puberty in the two sexes, at a younger age in girls than in boys, and this point would be indicated by a distinct fall in ratio between the gain in chest circumference for the year and the gain in body length for the same period.

To see if this fall in ratio actually occurred, I at once began to arrange and analyze the mass of figures I had collected during the examinations of that year and the one preceding. The results were chaotic.

Being convinced that this was due to inaccuracy in making the measurements, I then began to work with the Bowditch tables of measurements of American-born Boston school children, the results of which work are the cause for this paper.

These figures being compiled from American-born Boston school children—4,327 boys and 3,681 girls, from seven to sixteen years.

I took the number of inches gained in height and chest circumference from one year to the next in boys and girls separately, thus:—

Gain in chest circumference between the ages 7 and 8—girls .5; boys .5
Gain in body length between the ages 7 and 8—girls 2.1; boys 2.0

Then dividing the gain in chest circumference by the gain in height (5 ÷ 2.1) we get a figure approximately 2, which will indicate the ratio between the development in height and chest circumference during that year.

Proceeding in this way from Bowditch's figures we get then an average ratio for each year, one figure for the boys, one for the girls.

These figures are as follows (seven to sixteen years):—

	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16
Boys ..	2	3.8	3	3	3	2.9	4	6	4
Girls ..	2	4	0.9	5	3	7	7	10	16

Consulting my table I found, as I had expected, that there was a minimum ratio between gain in chest circumference and gain in body length, which appeared at a different age in the two sexes and that in each sex this minimum corresponded approximately to the period just before puberty in the two cases.

Thus in girls we get a startlingly low factor between the ages of nine and ten, while in the case of boys we get a less well-marked decrease in the factor between the ages of twelve and thirteen.

It might then be said that the danger point for pulmonary disease in girls occurs normally between the ages of nine and ten, while in the case of the boys between the ages of twelve and thirteen.

The earlier low period in the case of the girls corresponds to their earlier pubescence.

But if these danger periods in the two sexes are not merely apparent, but are periods of actual danger, the average age of recorded cases of pulmonary tuberculosis in children should be lower in girls; in fact, in children under eleven years it should be largely confined to girls.

Turning to the hospitals: I have been unable to find anywhere any statistics which would determine these points, although a persistent attempt was made, at several hospitals and in the literature. However, today this notice of a Babies' Health Contest at the Iowa State Fair in 1911 brought the subject again to my attention through the following paragraph:—

"The children scoring less than 80 points were decidedly below normal in weight and failed on all points excepting in height."

This makes me feel that such a danger period exists and I urge those in possession of statistics of age incidence of tuberculosis in children to examine those statistics with this in mind.

One more point I would emphasize. In addition to this natural danger period—if it exists—an adventitious danger period for pulmonary disease may occur at any time, and, if we are to believe popular tradition, does occur in girls at a certain time corresponding to the onset of puberty—the so-called "going into a decline period." Whatever truth there may be in this observation, at any rate in public statistics, we have a means for determining whether or not the normal ratio between growth in length of body and chest circumference has been disturbed in any case, and for recognizing a danger period at its onset during which period a child should be taken out of school and given the care it needs to bring this ratio up to normal. This would be a distinct, clear-cut use to which such a mass of statistics as we are collecting could be put.

BACTERIOLOGY OF ACUTE RESPIRATORY INFECTIONS IN CHILDREN.—L. E. Holt (*Journal American Medical Association,* 1910, Vol. LV., p. 1,241) reports the results obtained at the Babies' Hospital from over 1,100 cultures from the secretions of the respiratory tracts of over 500 patients and 30 nurses and attendants. The cases were divided into four groups: (1) Those with pneumonia. Most of the pneumonias were of the acute primary type, bronchopneumonia being much more common than the lobar variety. Only a few of the pneumonias were secondary to other infections. A small number were terminal infections in children suffering from marasmus. (2) Those with bronchitis and other respiratory infections, laryngitis, tracheitis, etc. The cases included in this group were for the most part rather milk infections. (3) Those with pulmonary tuberculosis. (4) Those with nonrespiratory diseases. These were surgical patients, children admitted for disordered nutrition (feeding cases) or other chronic diseases, healthy infants, 30 nurses and attendants. What a mixed infection the acute pneumonia of early life is was shown in a striking manner. That the character of the infection in bronchitis is essentially the same as that in pneumonia is not generally appreciated. In the second group of mild respiratory infections, however, the relative frequency of the different organisms found in cultures was about the same as in the first group, except that the percentage of influenza cases was higher. In the third group the tuberculous cases, the pneumococcus and *staphylococcus aureus* still predominated. In the fourth group, nonrespiratory cases, it was not surprising to find the *staphylococcus aureus* in about 85 per cent. of the patients and of the cultures, and the streptococcus in about one-half this number. It was, however, rather surprising to find that 52 per cent. of the patients showed the pneumococcus. The proportion of influenza cases falls the lowest in this of any of the four clinical groups; but it was found in 19 per cent. of the patients.—*American Journal of Obstetrics.*

NERVES AND THE NURSING MOTHER.*

BY CONWAY A. FROST, M.D.,
Utica, N. Y.

Someone has wisely said that "he who pays attention to trifles for trifle's sake is a trifler, but he who pays attention to trifles for the sake of obtaining knowledge of important things is a philosopher." The subject of my paper deals not only with a trifle, but with a subject already dealt with. Though I may be "fetching coals to Newcastle," it seems to me that this trifle is often overlooked with far-reaching consequences. The influence of the nervous system on the milk of nursing mothers has a farther reach than is at first realized. The fact that mother's milk is the only perfect food for the infant is often forgotten, though convincing data is at hand in proof of the assertion. Dr. Herman Schwartz, in 1911, gave a most exhaustive report of statistics derived from the observation of 1,500 nursing children, in which he refers to a report of Langsteiner, of Berlin, on infant mortality in 1906, showing conclusively (did we not already know by personal experience) the vital importance of maternal nursing. I will only quote the figures for January, in which month Langsteiner found the highest percentage of deaths among infants nursing from their mothers. With a total of 662 deaths, those fed on mother's milk number 85, on animal, 317; on other foods, 97; food not given, 161. So much stress has been laid on the proper formula and the best artificial food that without so intending we have lost sight of the best food and have utterly ignored the infinite change that may be wrought in the mother's milk. Were the same time and energy expended upon finding what element was the cause of the mother's upset and what may be done to remedy it that is put upon the cow's milk adaptation, something of importance might be forthcoming. The average physician upon being called upon to attend some infant with digestive trouble, if he does not immediately straighten things out, turns to his favorite text-book and skips the part that is devoted to rectifying any existing trouble with mother's milk, and reads up so and so's formula, and the long struggle begins. Even in as short a paper as this it is hard to hold the attention of those present from escaping to the cow and the favorite modification of cow's milk. It seems to me that we are missing an opportunity that might be used to bring to light something that would be of help in keeping the infant on the mother's breast. For some unknown reason, if the mother's milk has disagreed with the child, we not only inquire *first* what the mother has eaten to upset the infant, but we fail to look further if this line of inquiry brings nothing to light. I thoroughly believe that we are many times "barking up the wrong tree." And the trouble is more often due to a break in the mother's nervous equilibrium than to some pernicious food taken. The mother nursing her child is generally fairly careful of her diet regulation, but she will allow herself to be exposed to all sorts of major and minor shocks to her nervous system with perfect impunity. Have any of you ever watched a shepherd with the young lambs? In a recent novel I read of the care taken by the shepherd that the ewes be protected from any excitement. The old shepherd who had occasion to visit the lambing pen at night, carefully covered the light with his plaid so as not to startle the mothers. For he said, were he to startle them ever so slightly the milk was sure to disturb the young lambs. How often is the farmer's boy told to be careful in bringing home the cows not to irritate them for fear of spoiling the milk. Yet how little care is taken of the nursing mother in this respect! No particular caution is taken that the mother be not startled or irritated. The physician, upon his arrival, asks whether any irritating food has been taken the day before, but he forgets to ask if the cook was irritating or if the older children were allowed to worry their mother, or if the husband brought home his worries or appeared on the scene in a manner calculated to disturb the nervous equilibrium of the mother. I thoroughly believe that a life devoid of minor nervous shocks is of far greater importance for the well-being of both mother and child than a diet devoid of minor indiscretions. Just how these nerve strains interfere with the proper secretion of proper food we do not know. Metabolism, we know, is often inhibited, the whole digestive process upset and the sweat glands inhibited or stimulated by emotion, and yet we utterly ignore the emotional effect on the sensitive milk gland of the breast. Some study and reports have been made as to the result of nerve strain in general and nerve strain in particular, especially the upset of equilibrium and its results at menstruation as productive of indigestion in the infant. Just what occurs I do not believe we know. It has been my experience that proteids have been increased during such nerve upsets, and so, not because I consider this the only change, but the most palpable one, at my present state of knowledge, it has been my custom, when this could be proven, to increase the number of bottle feedings temporarily (if the child has been fed on mixed feedings) and also try to obtain higher fat and lower proteids in milk from the mother. This, of course, deals with only one phase of the trouble. The difficulty may, and probably does, originate from an increase of fat at times, for some authorities, Bendex among them, as quoted by Koplik, say they find greater variation in the fats. If these changes are found, after a nervous upset, in these elements, why not in others; the salts, for instance, the numerous enzymes and alexins, which are derivatives of the cells, the specific properties that are known to exist, but of which little is known. Let us use what little knowledge we have at our command if it clears up some of the cloudland. Let us use our knowledge more frequently to avoid the cow in these temporary upsets and obtain further light, that the cow and all other makeshifts may be postponed until the time in the baby's life that the cow is no longer a bugbear, but a blessing. Human milk is such a complex fluid and so little is known of its changes in character during such nervous upsets that this is written rather as an appeal for light than as a report of an investigation. I wish to emphasize the fact that in my experience I have observed that this upset occurs after irritation of the nervous system much more frequently than after errors in diet, and urge those whose facilities are greater to look into the cause, that a remedy other than discontinuance of nursing may be found. Do not misunderstand me on my attempt to emphasize the effects of nervous shocks on the milk of the mother. I do not wish to say that diet has no effect, but that it is of less importance than ease of mind. We were given a digestive apparatus that is capable of taking care of the ordinary, and, at times, the extraordinary, diet, but no digestive apparatus can stand the strain of worry, which, I believe, has been known to kill cats.

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* Read at the Annual Meeting of the New York State Medical Society, Pediatric Section, Rochester, April 30, 1913.

SOCIETY REPORTS.

THE PHILADELPHIA PEDIATRIC SOCIETY.

May 13, 1913.

THEODORE LE BOUTILLIER, M.D., PRESIDENT.

SPASMUS NUTANS.

DR. HOWARD KENNEDY HILL showed 2 cases of spasmus nutans, each with nystagmus and head-nodding both from side to side and forward and backward. In each instance the baby lived in a very dark room, where sunlight rarely, if ever, penetrated. There were some signs of rachitis, but not at all marked. Dr. Hill referred to his paper upon this subject, read before the Society May 10, 1910.

PYLORIC STENOSIS.

DR. C. HENRY LEFCOE presented an infant with pyloric stenosis. Birth was instrumental and the baby was breast-fed three weeks, with constipation and belching. Bottle feedings were added three times daily. Projectile vomiting followed almost every feeding up to seven weeks, in spite of various formulæ and methods employed. When Dr. Lefcoe first saw the baby, at seven weeks, it appeared to be *in extremis* and hospital care was refused. He improved upon hypodermoclysis and enteroclysis, small quantities of diluted whey hourly and olive oil inunctions. Tumor formation and gastric peristalsis were noted during digestion and persisted, vomiting ceased and constipation diminished. The food was gradually increased and the boy now takes an ounce of a fairly rich cream and whey mixture. Enteroclysis by the drop method is still employed twice a week. Mercurial oil inunctions are used daily. He is now five months old and weighs 9 pounds, 3 ounces. Gastric peristalsis and tumor formation are not so marked. There is no vomiting and there are two light yellow stools daily. Although no Wassermann was made and no specific history obtained, Lefcoe considers the marked improvement after the mercurial inunctions were begun as very significant.

Dr. J. P. Crozier Griffith said that Dr. Lefcoe was to be congratulated on the outcome of this case. It is true that the regular fecal discharges showed the pyloric stenosis not to be complete. It is very important to distinguish, if possible, between cases of stenosis dependent upon hypertrophic changes and those which may be called pylorospasm. Earlier German and English statistics showed a very encouraging percentage of recovery in cases called "stenosis" without operation. Undoubtedly in most of these cases the narrowing depended on spasm only. Dr. Griffith's experience has been that to distinguish between these two forms clinically has not, as a rule, been possible. The character of the vomiting, peristaltic movements of the stomach and the absence of fecal discharges are the same in each. Discovery of a distinct tumor on palpation is strongly in favor of hypertrophic stenosis, but in most cases this tumor cannot be found, even though an anesthetic be employed. Experience has taught him that it is not safe to make the absence of fecal movements the test of the presence of stenosis. He has seen cases gradually grow worse and finally be operated upon too late for benefit, the delay depending solely on the fact that the baby discharged feces; while in other cases of stenosis, absolute for days, or even longer, final complete recovery has taken place, the case certainly being pylorospasm. The conditions may often be combined, a certain degree of hypertrophic stenosis made worse or better at intervals by the presence or absence of pylorospasm. The diagnosis is of the utmost importance inasmuch as pure pylorospasm can be safely treated by lavage and expectant measures at least for a time, while the earlier the hypertrophic stenosis is operated upon the greater are the chances of recovery.

Dr. Alfred Hand, Jr., thought that Dr. Lefcoe's case showed the result of careful treatment. He has 2 similar cases now under treatment which he hopes to present to the Society next month. As they both have daily bowel movements they have not yet reached the surgeon.

Dr. Levi J. Hammond said that he had operated upon 4 cases of congenital hypertrophic stenosis of the pylorus, all accompanied with classical symptoms. Two had been performed upon infants of the same parents. Obstruction was complete—in one at forty-two and in the other at sixty days of age. In view of the pathologic findings of true hypertrophic changes at operation, radical treatment would seem alone indicated, and unless posterior gastroenterostomy, the operation of choice, be performed before medical treatment has proven valueless, the former cannot contribute its full measure of service, resulting in a high mortality. Mortality should not exceed 5 per cent. if diagnosis is made early and operation promptly performed. The patients here referred to all recovered; the oldest is now almost four years old.

RENAL CALCULI IN CHILDREN.

Dr. J. Stewart Rodman reported a case of bilateral calculus in a boy of twelve years, who had meningitis when three years old. Hematuria had existed for five months. X-ray showed stone in right kidney and three stones in the left kidney. The right was operated upon February 11, 1911, and the left November 12, 1911. Nephrotomy was performed at both operations and the stones found. Recovery was prompt after the first, stormy after the second operation, due to suppression of urine for forty-eight hours. The stones were uric acid. The boy was present, showing his good health. While bladder stones are common, recent literature shows renal calculus to be rare. It is more frequent in boys and in the first decade; more often found abroad than in America. There is great diversity of opinion as to actual etiology. Ebert considers uric acid infarcts so common as to be almost physiologic. Calcium contents of water and gastrointestinal disturbances are important contributing causes. Primary stone does little damage to kidney tissue, although secondary stones, the product of infection, are always accompanied by grave renal changes. The absence of typical renal colic in nearly all case reports is worthy of mention. Hematuria is a frequent symptom. Urate stones are most frequent. Cystin and xanthin stones are almost never found in children. Renewed importance must be attached to postoperative treatment, since stones may reform. The known solvent properties of the kidney must be aided.

Dr. Alexander Randall spoke of the many interesting points in bilateral renal calculus. The condition is not recognized in many cases, until the child has grown to adult age, unless some outward sign, as hematuria, develops; the X-ray usually makes the diagnosis. All stones do not, however, give shadows, as for instance, urate stones. Nor are all shadows stones, for they may mean tuberculous foci. The location of the stone by the interpretation of the X-ray plate is valuable pre-operative information. While cystoscopy has not been much used in children, Dr. Randall has used it, with catheterization of the ureters, for the performance of the phthalein functional test in 2 girls of three years, 1 of nine years and in an infant of twenty-six months. It is best to operate upon the better kidney first. After removing the stone by pyelotomy, copious lavage, using about a pint, is advised of the area wherein the stone lay. A ureteral catheter should also be passed down to the bladder before the wound is closed.

THE TREATMENT OF TUBERCULOUS ADENITIS.

Dr. John H. Jopson discussed some fallacies in the treatment of tuberculous adenitis. He said that there appeared a tendency on the part of some surgeons at present to recede from the former attitude in regard to the surgical treatment of tuberculous adenitis and to substitute conservative measures for extensive operative procedures. The simple incision and curetment of broken-down glands in conjunction with hygienic measures was recommended by some, while the X-ray, tuberculin therapy and Bier's hyperemic treatment had their advocates. It seemed to him that the extravagant claims of the upholders of the X-ray were unwarranted or founded upon insufficient data and that, when they condemned the results of operative treatment as unsatisfactory, they ignored the work of men like Dowd and others. The studies of long series of cases by Dowd, Wohlgemuth and Von Noorden had shown that cures in children could be obtained by radical treatment in from 70 to 90 per cent. of cases, while the 649 cases reported by Judd in Rochester, mostly in adults, also gave splendid end results. A study of the pathology of the condition shows that the infection which found entrance through the tonsils, the teeth and the mucous linings of the buccal and pharyngeal cavities lodged primarily after passing these portals in the lymphatic glands in the upper portion of the neck and passed from them into the deeper chain along the great vessels. There was more tendency to spontaneous limitation in children than in adults, but in neither case was there communication with the bronchial or mediastinal glands. The tedious nature of the operation made it one which did not appeal to all surgeons. The X-ray, as shown by quoting Pancoast and others, was useful as an adjuvant to surgical treatment, but could not replace it, while tuberculin therapy was protracted, expensive and contraindicated where advanced caseation and liquefaction necrosis were present. (See p. 567 for article in full.)

Dr. E. B. Hodge said that the bacteriology of the condition is interesting. Dr. Paul A. Lewis had found that about 25 per cent. of cases show bovine tubercle bacilli. The tonsils and adenoids, which seem to be the usual portal of entrance of the tubercle bacillus, are not removed as regularly as should be the case. Operation, if thorough, is successful. While often difficult, it results in a perfect cure. Dr. Hodge agrees with Dr. Jopson; his results with the X-ray and with tuberculin have not been good. The modern operation is systematic, complete and, with its incision in the neck folds, leaves little or no scarring.

Dr. G. M. Dorrance said that operations upon the neck are the most satisfactory, as they require some anatomical knowledge. After a number of failures he was induced to try the X-ray in glands of the neck upon patients who refused operation and was agreeably surprised at the results obtained. Since then he has not operated unless the masses were exceptionally large; and followed this by a series of X-ray exposures. The reason for the number of operations is that cases recur and are reoperated upon either by the same or some other surgeon. Latest French textbooks recommend the X-ray treatment rather than operation, since this leaves little or no scar. It is important to prevent glandular involvement, which can be done by attention to the teeth and tonsils. The primary source of the infection should be removed. Caseous material is often found in tonsils; Dr. Dorrance always has them removed. With removal of the primary source, many cases will recover spontaneously. Besides, there is a certain operative mortality from ether, hemorrhage, etc. It is not advisable to give ether, since many cases have tuberculous foci elsewhere. He believes Dr. Jopson's statement that 30 per cent. of cases die from tuberculosis.

Dr. Jopson stated that he was always in the habit of recommending the removal of enlarged and diseased tonsils and adenoids in these cases. He had frequently seen them removed before operation for glands was undertaken, but believed that only exceptionally could operation be avoided thereby. Nevertheless, in every case the portal of entrance of the tuberculous germs should be the subject of careful study and treatment. If, as Dr. Dorrance says, 80 per cent. of these cases recover after removal of tonsils and without adenectomy, then the total number must be enormous. We see these cases in all stages of caseation and suppuration where removal of the tonsils could not possibly result in cure, and one can easily see by consulting the daily list of operations, now being published by the *Bulletin of Surgical Clinics,* that operations for cervical adenitis constitute a large proportion of the cases operated in every clinic. The operation cannot, therefore, be said to be considered an unsatisfactory one by the majority of surgeons or one which can be avoided by simple removal of adenoids and tonsils. The incision he prefers in these cases is the oblique one, which follows the natural creases of the neck, leaving a relatively small scar and one that does not, as a rule, hypertrophy or stretch afterward.

WHAT CAN BE DONE TO PREVENT MILK POISONING?

Dr. William N. Bradley read this paper. He said that hundreds of babies die every year from diarrheal diseases, largely due to milk poisoning. The cause of milk poisoning is the existence of pathogenic bacteria in milk. They are present in ordinary market milk in large numbers, due to unsanitary conditions surrounding the production and handling of milk. It is probable that milk is primarily infected at the farm, where very little thought is given to producing a clean milk; and throughout successive stages of transportation the milk is repeatedly exposed to sources of contamination. This is possible because of lack of adequate official supervision. While the Board of Health prescribes regulations, lack of funds prevents their enforcement. Such a contaminated product is unsafe and unfit for use. Our only protection against infected milk lies in pasteurization. Schorer and Rosenau state that, when milk is heated to 140°F. and kept there twenty minutes, tubercle, typhoid and diphtheria bacilli, as well as all bacterial toxins are destroyed. As it is practically impossible to obtain milk free from infection, all milk should be properly pasteurized. Since any irregularity or any variation of temperature or time will render the process inefficient, it is obvious that all pasteurizing plants should receive expert official supervision. Regular instruction and training of the operators of pasteurizing plants would do much to further efficient pasteurization. But pasteurized milk is only a makeshift for clean milk. The vast sums of money used in equipping and maintaining pasteurizing plants could be expended to much better purpose in producing clean milk, prepared by careful attention to all details of production and proper protection from contamination in all stages of handling. To this end the American Association of Medical Milk Commissions has prescribed regulations governing the production of "certified milk." Only milk produced under such conditions is safe and fit for use. (This article appeared in the July ARCHIVES, p. 519.)

DR. HAND said that we can prevent milk poisoning by putting no milk into the baby's bottle that can poison the baby. Even clean milk may be spoiled before it reaches the infant. Efficient pasteurization is necessary during the summer. He had noticed in three hot summers that when the temperature hovered around 100°F. there was not a great increase in the incidence of enterocolitis as shown by the work in the dispensaries and by vital statistics, and he could not explain this until it was suggested to him by Dr. Weber that the big milk dealers probably took extra precautions in pasteurizing and so actually sterilized most of the milk served to the city.

DR. A. H. DAVIDSON said that some man with executive ability is needed who could organize the centers of milk supply into one system with a supervision that would meet the highest standard and make for the elimination of the unnecessary expenses incidental to individual effort.

DR. W. S. CORNELL said that endeavors have been made by the Board of Education by lectures to older girls in the schools to teach them the importance of keeping milk clean. He suggested that a clean milk, prepared in three or four commonly used formulas, be kept on sale at drug stores, where all physicians and parents could purchase it.

DR. BRADLEY added that an advance in the price of the milk would be necessary and justifiable, but the farmer should receive this advance as a compensation for improved methods on the farm.

BLOOD PRESSURE IN INFANCY.

Dr. Hill, after reviewing the literature upon blood pressure in young children and infants, reported the findings in 25 babies under two years of age suffering with severe gastroenteritis, treated at the Babies' Hospital of Philadelphia. The conclusions drawn, although there were exceptions, were that the blood pressure was rather higher than in normal babies, with a mean between the systolic and diastolic pressure which, when large, gave rather a poor prognosis. (Article in full on p. 588.)

Dr. Percival Nicholson said at present it was almost impossible to obtain any accurate standard readings in normal cases, as different observers have used cuffs of such varying widths. A 12 cm. cuff would give correct readings, but in infants and many children it is not feasible to use a cuff so wide, as there is not sufficient distance between the articulations on either the arm or thigh to permit its application without the cuff extending over the bony points of the articulation. In recent experiments, he has found marked differences due to variations in the width of the cuffs used. Pulse pressure or the difference between the systolic (maximum) and the diastolic (minimum) readings is not altered materially by a difference in width of the cuffs, as systolic and diastolic pressure are altered proportionally. Pulse pressure is especially important in blood pressure work, as it shows clearly the head of flow and is a good estimate of the extra force the heart is exerting over and above the peripheral resistance, as indicated by the diastolic pressure. As the pulse pressure becomes smaller, the circulation is impaired and when the difference is small life is endangered, death ensuing when the systolic and diastolic pressures are equal, or, in other words, when there is no pulse pressure. Dr. Nicholson has found it very difficult to obtain readings by the auscultation method, using the thigh and listening over the popliteal artery, as that vessel lies deep and the sounds are hard to hear. At present he uses the arm, auscultating over the brachial artery in children over three years; in young infants he considered the Hoobler modification of the Fette indicator best.

THE PHILADELPHIA PEDIATRIC SOCIETY.

June 10, 1913.

THEODORE LE BOUTILLIER, M.D., PRESIDENT.

CEREBELLAR ATAXIA.

DR. CHARLES W. BURR presented this case, which was interesting, as he was not altogether sure of the diagnosis. The boy is now twelve years old. Birth was normal. He was breast fed. At one year he had a convulsion while teething. The mother says that he has never seemed really well since the convulsion, but is unable to give any clear account of his illness. He did not learn to walk until eight years old. He has never talked well. At present he exhibits markedly ataxic gait; good station with eyes open or shut; no ataxia in the arms; slight lateral nystagmus on looking to the left; at times slight nystagmus when eyes are at rest. The fundi are normal. The knee jerks vary from time to time; ordinarily they are very marked, sometimes they appear decreased. When decreased, it is due to the fact that the boy is inhibiting movement. Stroking the outer side of the right sole causes extension of the great toe and slight extension of the small toes. Stroking the left sole causes flexion of all the toes. Speech is somewhat thick. There is no facial paralysis and no palsy of the tongue. He has had no schooling and is very ignorant, but his mental power is much better than appearances indicate. When first seen by Dr. Burr he thought the case one of pure cerebellar ataxia, but after further study of the case concluded that it was one of those instances of combined cerebellar and posterior cord disease. The case is not a familial one.

CASES OF CONGENITAL PYLORIC STENOSIS.

DR. ALFRED HAND, JR., presented 2 infants, together with a specimen from a third infant, showing congenital hypertrophic stenosis of the pylorus.

DR. LEVI J. HAMMOND read this paper. He said that widespread interest in congenital pyloric stenosis began in 1888, and has held a conspicuous place in the literature dealing with impaired gastrointestinal drainage with increasing interest up to the present time. There seems to be no controversy between pediatrist and surgeon as to the frequency of its occurrence, though there still exists a reasonable difference between them as to the wisdom of placing all degrees of stenosis in the surgical category. The condition as an entity becomes perfectly clear when we keep before us the embryologic and anatomic development and physiologic function of this portion of the digestive tract. Congenital stenosis may be accounted for through vice in development of the organ itself or defect in the development of some of the determining organs with which it shares in the process of formation, as, for example, the liver, the formation of both of which is from the right primary foregut. This defect may occur as an inverse twisting or a reverse growth of the longitudinal or circular fibers, or both. It seems possible for the rather intricate anatomic arrangement of this organ to meet with disaster in its embryologic development, either in defect of structure alone or by faulty position in which it may be placed by the liver, which is claimed by some biologists to influence the pyloric development through a shortening or twisting of the primary foregut. It is, therefore, not uncommon to meet such coexisting lesions as hernia, dilatation of the colon, cardiovascular disease and supernumerary organs. In none of Hammond's patients was there visceral transposition. Anatomically, the pylorus is formed by a reduplication of mucous membrane from the stomach, intermixed with muscular fibers having a definite function of dilatation and contraction. These muscular fibers are aggregated into a thick circular ring, the longitudinal fibers and serous membrane taking no part in the formation of the ring, though they pass directly over it. The orifice differs greatly in shape; it is occasionally oval, sometimes a circular fold is replaced by a crescentic one, placed one above the other below the orifice; more rarely there is but one crescentic fold. There is no organ in the body, the position and shape of which presents more frequent alterations, and possibilities of anomalous changes than the pylorus.

The pathogenesis still lends itself largely to a theoretic discussion. The problem must involve a consideration of those factors entering into developmental tissue defects. H. I. Nicoll says it may be the result of a primary congenital developmental aberration, possibly connected with the junction at the pylorus of two different processes of development; or it may be the result of congenital hypertrophy of the muscular walls of the pylorus secondary to antagonistic and incoördinate action of the stomach on the one hand, and the walls of the pylorus on the other; or it may be dependent on functional disorder of the gastric nervous system; or it may be the result of spasmodic contraction, arising from gastric irritation after birth and therefore not congenital; or the condition may be the result of a chronic inflammatory process. Neither of the last two theories could be assigned by those who have had the opportunity to study the actual pathology as found on the operating table or under the microscope. The babies are, as a rule, plump and well formed at birth. Abnormalities in development are at times found, analogous congenital anomalies. More than half of the recorded cases were breast-fed babies. The earliest symptom is vomiting, beginning soon after birth or delayed several weeks; at first only simple regurgitation after feeding, later persistent and unyielding to all remedies. As the dilatation of the stomach increases, vomiting may be delayed until after two or more feedings, when the entire quantity will be expelled. It is projectile in type and is not believed to be accompanied by nausea. If the food has been in the stomach some time it will be ejected partly digested, which is proof that the digestive power of the stomach is not at fault. If the occlusion is not complete there may be some bile staining the vomitus. The epigastrium becomes prominent, due to the dilated stomach, while the hypogastrium is scaphoid because the intestines are empty. If occlusion is not complete, scanty stools will be passed occasionally; when complete, the stools will consist mainly of bile-stained mucus. After feeding, the peristaltic wave of the contracting stomach through the thin abdominal wall can be plainly observed rolling from cardia to pylorus. At times the tumor can be felt in the region of the pylorus, though more often the liver, which is invariably enlarged to once or twice its natural size, so covers it over as to prevent its being palpated. In two of Hammond's cases the tumor could certainly not be felt; in one it was doubtful; in the fourth it was distinctly palpable. The peristaltic wave was typical in all. The other symptoms are those incident upon persistent vomiting, such as loss of flesh, progressive emaciation, exhaustion, subnormal temperature and the classic picture of marasmus. That functional spasm plays a considerable rôle in the production of mere symptoms cannot be doubted. The alternating improvement and relapses commonly seen would indicate it, as would also the cases believed to be cured by medical treatment. The types, from a diagnostic standpoint, may be grouped into three classes—those in which marked hypertrophy exists, with little if any spasm; those in which a moderate degree of hypertrophy is present with spasm as the major factor in the occlusion; and an intermediate class, when both exist but neither the hypertrophy nor the spasm is intense. Even with greatly thickened walls there is not of necessity complete obstruction, the degree of hypertrophy and of spasm varying widely in different patients. It is logical to suppose that patients in whom the signs and symptoms have been typical of pyloric obstruction, yet which recovered under purely medical treatment, were those in whom spasm had been the most prominent element and the degree of hypertrophy moderate. It is, however, inconsistent with our knowledge of the function of the pylorus to suppose that any degree of hypertrophy, even though it be minor, could exist without causing symptoms of impaired gastric drainage. Some physicians question whether these cases are truly congenital or hypertrophy secondary to spasm, the latter arising postnatal, from irritating food or hyperacid secretion. The demonstrable existence of symptoms so soon after birth in a healthy breast-fed infant would seem to discourage such a belief, and there must surely be but few persuaded to the belief that an infant nursing from the breast of a healthy mother could supply the stomach with sufficient irritation from the food taken to produce symptomatic spasm. Especially is such a belief difficult to maintain when the operating table demonstrates the existence of such definite pathology. It is conceivable that functional spasm might occur in adults from long-continued indiscretion in diet, which so alters the normal gastric secretion as to produce irritation; but even in such an instance Dr. Hammond believes that some degree of hypertrophy is present and the actual underlying cause of the spasm.

The differential diagnosis must be made from simple recurrent vomiting, due to improper or over-feeding; from extrinsic causes, such as tumor in neighboring tissues like retroperitoneal growths, and from visceral adhesions. It is claimed by some that the presence of acetone and diacetic acid in the urine is a point of differential value in distinguishing cases of simple recurrent vomiting from pyloric spasm. In some cases differentiation cannot be made unless it be in the lesser severity of the symptoms, less rapid and less progressive loss of weight, which would be expected were the obstruction away from the pylorus and incomplete. Where spasm is the major factor in the obstruction, marked improvement with sudden relapses should be the most classic differential point. A definite tumor is always demonstrable, consisting of a circular indurated growth, occupying the entire circumference of the pyloric site; in some instances it is more or less cylindrical in shape, extending well into the first portion of the duodenum. Its serous surface is smooth and usually not adherent to the neighboring tissues. Microscopic study shows a great increase in thickness of both circular and longitudinal fibers, the greatest thickness being noted in the circular fibers. Considerable proliferation of the connective tissue is also demonstrable, the thickness in some instances amounting to two or three times that found in the pylorus of normal children of the same age. So extensive is this hypertrophied tissue that it would be contrary to logical reasoning to assume that either developed postnatal; it was present in all of Dr. Hammond's patients, from forty-two to sixty days of life; hence it could not possibly have thus developed. Two infants were born of the same parents—the boy forty-two and the girl sixty days old when seen. From history and symptoms it is believed that total obstruction had existed in the first case eight and in the second four days before operation. The third infant, a girl, was fifty, and the fourth, also a girl, was fifty-six days old when first seen. The history in the former was eight, and in the latter, 6 days of total obstruction before operation. All were emaciated to the greatest possible degree, but promptly gained in weight and health after operation had established free gastric drainage. As this condition is surgical from the onset, medical treatment should not be employed longer than is necessary to establish the diagnosis. This applies alike when the cause is either persistent spasm or hypertrophy, for even though the obstruction be due to spasm alone, which is hardly conceivable, such patients die from inanition if the spasm is intense, prolonged and frequently recurrent; hence it is as dangerous as hypertrophy. Within a few hours after operation has established free drainage, nourishment can be taken in small quantities, and increased to full feeding in three days. Surgical treatment should consist in either pylorectomy or posterior gastroenterostomy; the former is indicated where the pathology is demonstrably localized. As this is not often possible, posterior gastroenterostomy is to be chosen to meet the greater number of indications. The early recognition of the precise nature of the condition and prompt operative treatment before tissue cell resistance has too greatly ebbed away, should result in the recovery of at least 80 per cent. of patients.

UNUSUAL NEUROSIS IN A CHILD.

Dr. A. A. Howell, by invitation, reported this case, in which a high-strung child of eight years, from the initial symptoms of vomiting and "water-brash," developed a neurosis. The chief manifestation of this neurosis was a spasm of the muscles of the tongue and throat, similar to, if not actually accompanied by, laryngospasm. From a therapeutic standpoint especial emphasis was laid on the fact that while carefully directed treatment at home proved futile, under the advantageous surroundings of a hospital, it was entirely successful.

Dr. J. Claxton Gittings said that it was not possible to describe adequately the miserable condition of this boy when at his worst. He had attacks at intervals of fifteen to twenty minutes by day and ten minutes at night, with not more than two hours' continuous sleep. While the diagnosis of a neurosis is a dangerous one to make, the elimination of all adequate organic cause justified it. The only possible point of reflex irritation was a very small amount of adenoid tissue in the nasopharynx; the attacks began before the acute coryza, however, so that the adenoids can hardly have originated them. While hysterical vomiting is not so rare, laryngospasm in a boy of eight years, inducing vomiting, is unique in our experience. Nor will hysteria explain the greater frequency of the attacks at night, which robbed the boy of his sleep. Whatever the exciting cause may be in these cases, Dr. Gittings has found that the neuroses are most apt to occur in the type of nervous child who is excessively pampered and never adequately controlled, who never learns, in childhood at least, to exercise self-control. The good results of hospital treatment are due primarily to the "moral impression" which, in turn, makes the strict regimen possible.

Dr. Howell added that, at times, during the course of this boy's treatment at home, it would seem that satisfactory progress was being made, when relapses would occur. These were at first unexplainable, but upon close questioning of the mother it was found that the boy, who was supposedly quiet at home, had in reality been catching for his brother, a pitcher. It was also found that, at these times, he would slip off to see baseball games, and, in all probability, without his parents' knowledge, play himself. The continual talking of the father, in the boy's presence, of his symptoms and condition and the paralleling of this with those of his brother who had died, could not be stopped and undoubtedly did harm. The above are cited as examples of the hopelessness of gaining complete control of a case at home unless the unreserved coöperation of patient and family can be depended upon.

Small-pox Vaccination.—Incited by an editorial in *American Medicine,* criticising certain statistics of Kitasato and the British Royal Commission which throw doubt on the long duration of vaccination immunity, A. W. Lescohier, Detroit (*Journal American Medical Association,* August 16th), publishes the results of his own investigation of 215 patients revaccinated from one to thirty years after a successful vaccination. He finds a surprisingly large number of successful "takes," though varying greatly in the different intervals. Thus he found 28 per cent. successful a year after the last successful vaccination, 33 per cent after two years, 48 per cent. after three years, 50 per cent. after five years, 85 per cent. after ten years, and 91 per cent. after eleven years. The number of cases at each interval were not large, and this must be considered, but on the whole his findings accord fairly well with those of Kitasato, who deduced from his own investigations that immunity is practically *nil* after ten years. Lescohier admits that these figures can hardly show the actual immunity given by one successful vaccination, as it is reasonable to suppose that higher resistance would be required against a direct inoculation than against infection in the usual way. It is, moreover, a universal experience that small-pox is rare in individuals who have been vaccinated within five or six years. Still he thinks the country is not adequately protected and there is too great an apathy in regard to revaccination.

CURRENT LITERATURE.

ABSTRACTS IN THIS NUMBER BY
DR. J. F. SAMMIS. DR. S. W. THURBER.
DR. CHARLES E. FARR. DR. WM. A. MURPHY.

THE CHILDREN'S NUMBER OF *AMERICAN MEDICINE.*

REVIEWED BY J. F. SAMMIS, M.D.

The June number of *American Medicine* was a special number devoted to the diseases of children and presented a series of original articles which the ARCHIVES has been glad to abstract in full. Such an issue is a credit to any publication and sheds lustre upon the editorial staff who arranged it. It is also an indication of the increasing interest paid to pediatrics as a specialized branch of medicine and to the greatly increasing output of articles on pediatric subjects. We congratulate the editors of *American Medicine* and hope that our readers may profit by the excellent abstracts which Dr. Sammis has prepared. [ED.]

PRITCHARD, ERIC: THE HEAT REGULATING MECHANISMS OF CHILDHOOD. (*American Medicine,* June, 1913.)

At the time of birth the complicated heat regulating mechanism of the nervous system is incompletely developed and it behaves more like that of cold blooded animals, *i.e.,* it shows rise and fall in close correspondence with the temperature of the surroundings, a fall to 90°F. not being uncommon directly after birth if no precautions are taken. Young infants can, however, survive a lowering of temperature which would be fatal to adults. The thermotaxic centers must be educated to their full capacity, so that small changes of temperature, or even greater ones, may be taken care of by the more highly developed heat centers. Pritchard advises a rational "hardening" method, which must be determined by the child's individual physiologic capacity. The first "lessons" are very elementary and the transition from one degree of stimulation to another very gradual.

As soon as the child is assimilating its food and gaining in weight it is placed out of doors with suitable precautions to prevent "chill." Pritchard thinks the bath is the best means of educating the thermal sense, as it is more easily controlled. The first bath is given at 100°F. and reduced 1° each day until 80°

is reached. In many cases at five months a bath at temperature of 60° to 70° F. is given with the greatest benefit. The "graduated cold bath babies" are easily recognized by their clear complexion and general appearance of health and vigor.

Inasmuch as by far the largest part of the food given a child is utilized for heat production, he emphasizes the fact that the amount of food required is to a degree dependent upon heat radiation, and speaks of Dr. Lavialles's experiments, in which he found, for instance, that the use of a simple bonnet which covers the side and back of the head will effect a saving of some 80 calories in the twenty-four hours, or the equivalent of the heat value of 4 ounces of milk. Even greater economies are effected by the wearing of stockings, sleeves and outside shawls.

CAUTLEY, EDMUND: THE PROGNOSIS OF HEART DISEASE IN CHILDREN. (*American Medicine,* June, 1913.)

Dr. Cautley believes much too serious a view of the prospects of cardiac affections has been, and still is, taken, the outlook depending entirely upon the degree of involvement of the cardiac muscle. The essential point is summed up in answer to the questions:—

A. *What is the possibility of compensatory hypertrophy taking place and being maintained?*

In children the cardiac muscle has not the same power of resistance as in later life and its work is greater—both to overcome disease and to grow. Its ability to compensate is dependent upon (1) the extent and type of the lesion as shown by (*a*) the number of valves affected and the type of the lesion, *i.e.*, obstructive or regurgitant. The gravity increases with the number of valves affected. Stenosis is always more grave than regurgitation. (*b*) The condition of the myocardium. (*c*) The condition of the serous surfaces. (*d*) The state of innervation as shown by pain. Cardiac pain must be regarded as a sign of undue strain on the muscle. (2) The magnitude of the lesion as shown by (*a*) the greater or less development of physical signs proper to the lesions. (*b*) Hypertrophy with or without dilatation, general or partial. (*c*) The effect on the cardiac circulation, leading to degeneration and its results. (*d*) The effect on the systemic and pulmonary circulation.

B. *What is the probability of efficient compensation being* *maintained?* (1) Is it traumatic in origin? (*a*) Due to strain or injury? (*b*) Acute disease which sooner or later will come to an end? (2) Is it constitutional in origin? An important element in the prognosis is the degree of probability of a recurrence of the exciting causes.

C. *Social and personal factors.*

Congenital heart disease—the greater the cyanosis the worse the prognosis. Convulsions, paroxysmal dyspnea, persistent low temperature and hemorrhage are bad signs in the early weeks of life.

KELYNACK, T. N., M.D.: MEDICO-SOCIOLOGICAL ASPECTS OF CHILDHOOD. (*American Medicine,* June, 1913.)

This is an interesting resumé of the various kinds of effort being made to properly care for the child along the lines of child welfare, hospitals, mothers' schools, tuberculosis dispensaries, sanatoria and preventoria, moral education, eugenics, physical education, the care of mentally deficient children and the like, including congresses such as that on school hygiene to be held in Buffalo this fall.

CAMPBELL, H. J.: THE PRINCIPLES OF TREATMENT IN CHILDHOOD. (*American Medicine,* June, 1913.)

The nervous system of the child is in a state of unstable equilibrium and is affected somewhat differently, both in kind and degree, from that which occurs in the more fixed nervous apparatus of the adult. Care should be taken in the administration of those drugs that affect nerve cells, and, on the other hand, those drugs that depress nerve endings may be freely used, and as a rule, are well borne. Disassociation and assimilation is greater in the child than in the adult. There is not the same specialization of function and localization of attributes which is seen in the mature organism. As an example: Eczema is less prone to limit itself to the inner aspects of the limb and psoriasis to the outer. Each system is more elastic, action and reaction occur more quickly and in response to slighter stimulation in the child than the adult and hence smaller relative doses produce more effect. None of the degenerative processes are likely to have taken place in any of the organs such as have occurred in adults.

Treatment in children should be prompt, as they run down quickly, and every effort should be made from the beginning to conserve the strength and avoid exhaustion.

Children pick up more quickly from an acute illness than adults, but they are more liable to nervous, kidney and cardiac sequelæ.

VINCENT, RALPH: ON PASTEURIZED MILK AND ITS EFFECTS. (*American Medicine,* June, 1913.)

The writer feels strongly that the doctrine that an unsafe milk is rendered safe by processes of pasteurization is in error, and claims that it is largely responsible for the dirty milk in England and in other countries.

When an infant or child is fed on pasteurized milk the normal growth and action of the organisms present in the alimentary canal are retarded. Coincident with the retardation of their active development their dominance also fails and the proteolytic organisms begin to establish themselves in the small intestine, and once this process begins the lactic organisms are rapidly overwhelmed. Any method of pasteurization which effectually and certainly destroys the "pathogenic" organisms also destroys the organisms typical of pure milk, *e.g.*, the streptococcus lactus and the lacti bacillus.

In pasteurized milk bacillus putrificus, bacillus enteritides sporogenes and bacillus mesentericus, amongst others, are frequently found.

None of the organisms growing in pasteurized milk are capable of growing in raw milk or in the alimentary canal of an infant or child fed on raw milk. The streptococcus lacticus is invariably present in breast milk as it is received by the infant.

LANGMEAD, FREDERICK: ON THE VALUE OF CITRATED WHOLE MILK IN INFANT FEEDING. (*American Medicine,* June, 1913.)

Dr. Langmead believes after an experience of five years in the use of undiluted cow's milk citrated that it is the best form of artificial feeding in all but exceptional cases. He gives grs. ii to each ounce of milk, which may be begun when the child is two weeks old if necessary.

The advantages which he claims for it are: Small volume of the feed as compared with diluted milk; its simplicity. Its disadvantages are its tendency to produce constipation.

FORSYTH, DAVID: OBSERVATIONS ON BREAST FEEDING. (*American Medicine,* June, 1913.)

Dr. Forsyth's series of observations comprise a continuous estimate of the consumption of breast milk by an infant of the better class from the fifth day after birth until the forty-ninth day. No other nourishment was given and the mother had every advantage in the way of food, nursing, etc., which is customarily available for those whose circumstances are easy.

The most notable feature of the observations was the variability in the consumption of milk. No diurnal cycle of activity of the mammary glands could be traced—a fact which excludes such influence as meals, sleep and fatigue on the part of the mother. The children appeared to be no more satisfied with the larger than with the smaller feedings. The secretion, though becoming ampler with the growth of the child, varied from day to day under the influence of maternal factors. One examination of the breast milk he considers to be practically valueless. The observations must be continued for at least twenty-four hours and ought to cover several days together. If this be done the results will be informing and trustworthy.

HODGETTS, CHARLES A., M.D.: THE SCOPE OF SANITARY WORK IN THE HOME. (*American Medicine,* June, 1913.)

A plea for the extension of the activities of health officers to preventive work in the belief that many of the evils which arise from unsanitary home conditions and many of the diseases incident to child life can be handled and controlled best in this way.

HOLT, L. EMMETT: THE SIPHON TREATMENT OF EMPYEMA IN INFANTS AND YOUNG CHILDREN COMPARED WITH OTHER MEASURES. A STUDY OF 154 CASES. (*American Medicine,* June, 1913.)

The method used was a modification of the treatment used in Germany by Bülau a little more than twenty years ago. A puncture is made at the site of operation with the needle, which is allowed to remain in as a guide. A puncture incision is then made with a bistoury or scalpel. The wound should be a little smaller than the drainage tube to be used, as it can be readily stretched in introducing the tube. A ring cut from the drainage tube is slipped over the tube for about an inch and forms a collar to prevent the tube's slipping into the chest cavity. And above this is placed a piece of broad tape with a small buttonhole in the center which fits snugly over the drainage tube and pulls against the collar formed by the rubber ring. The tube is inserted into the chest up to the collar; the tape is then applied to chest wall and held in place by four or five strips of adhesive plaster. The drainage tube is connected with another tube which enters a bottle underneath the bed. The bottle is half full of sterile salt solution and is plugged with a rubber stopper.

His conclusions are:—

(1) Empyema of infancy has a high mortality under any method of treatment yet proposed.

(2) One of the chief obstacles to recovery is the difficulty in expansion when the lung is subjected to atmospheric pressure. This rather than imperfect drainage is the principal factor in causing the present high mortality.

(3) Aspiration, while occasionally sufficient to cure localized empyema, is not to be depended upon as a means of treatment.

(4) The injection of bactericidal substances is not generally superior to simple aspiration, and is open to the same dangers.

(5) Rib resection is not to be advised in recent acute cases in patients under two years old. In chronic cases it may be necessary at any age.

(6) Simple incision between the ribs with the introduction of a single tube is sufficient in most cases to secure adequate drainage. It accomplishes in recent cases all that rib resection can do with less disturbance to the patient.

(7) Siphon drainage is to be preferred to any other treatment in infants, especially those under one year, giving not only proper drainage and facilitating expansion of the lung, but causing the least disturbance of the patient during the treatment and showing the highest proportion of recoveries.

Pisek, Godfrey R.: Obscure High Fever in Children. (*American Medicine,* June, 1913.)

These conditions are more often correctly diagnosed by the practitioner who is systematic and painstaking; one who will call to his aid all the modern scientific resources at his command rather than by the man who relies upon his "experience."

Elevation of temperature may be due to very slight causes, and is often out of all proportion to the symptoms. Hot weather, an overheated room, constipation may be cited as examples.

He places the cases of obscure fever in three groups:—

(1) Those that may be cleared up by a thorough physical and chemical examination.

(2) Those in which the disease is in its early stages and has not sufficiently developed.

(3) Uncommon diseases, but important from the standpoint of treatment.

No fever in a child should be considered obscure until we have examined the ears, blood and urine as part of the routine examination. A diagnosis is well started when the physician is fully cognizant of the possibilities hinging upon a certain prominent symptom.

FISCHER, LOUIS: CEREBROSPINAL MENINGITIS IN INFANCY. NOTES ON THE DIAGNOSIS AND TREATMENT. (*American Medicine,* June, 1913.)

Human milk, although conferring a certain amount of resistance to infection from this disease, does not convey immunity. The meningococci often lie dormant in the crypts of the tonsils and in the pharynx and gain access to the brain by the lymph channels. Direct contact with infectious secretions is a frequent means of transmission.

Special emphasis is placed upon the lumbar puncture in the early stages to determine the diagnosis. If the lumbar puncture yields a dry tap for any of the several reasons which are mentioned and rigidity and opisthotonos still continue, he suggests aspirating the lateral ventricles; if in an infant through the anterior fontanel, if in an older child by the method known as the Kocher method, which is described by the writer. The use of Flexner's serum has been very successful in the hands of Dr. Fischer. Antipyretic measures, such as cold packs, ice to the head and tub baths, are indicated. Cupping of the neck and spine sometimes relieves internal congestion.

KERR, LE GRAND: THE RATIONAL TREATMENT OF THE HEMORRHAGIC AFFECTIONS OF CHILDREN.

With the exception of hemophilia, whose etiology remains uncertain, hemorrhagic affections of children are largely due to toxic substances which find their way into the circulation. These affect not only the nervous system, but the endothelial lining of the smaller blood vessels and there produce degenerative changes. Coagulability of the blood is seriously interfered with and the clot lacks the firm contraction of normal blood.

The primary objects of treatment should be: (1) To combat toxic elements which change the character of the blood. (2) To limit their effect upon the blood vessels. (3) To improve the coagulability of the blood. The first objects may be accomplished in time and are not urgent, but the last justifies no delay.

The writer feels assured that we possess two agents which will accomplish this—blood serum and whole blood. Transfusion is to be preferred. If this is impracticable for any reason, the injection of whole blood beneath the skin is both easy and efficacious.

COLLINS, JOSEPH, AND GLIDDON, W. O.: THE TREATMENT OF ACUTE CHOREA. (*American Medicine,* June, 1913.)

The work done by these two physicians was undertaken in order to determine in how far the use of arsenic as commonly used in chorea was efficacious. The treatment which was given was: Rest in bed as absolute as possible; of complete isolation; of cold blanket packs, temperature 65°F., one hour duration, two or often three times a day, when the motor rest is profound; of a milk diet, the sweet milk being combined with some alkaline and Bulgari milk being given without dilution; and the administration of saline laxatives when necessary. The result was: Completely cured, 63 per cent.; sufficiently improved to warrant their leaving the hospital, 27 per cent.: untreated, 2 cases; not improved, 2 cases. The use of arsenic, antipyrin, evalgin, iron and bitter tonics has been entirely discarded by them. Only in those cases manifesting symptoms of rheumatism were drugs used at all. These were given salicylates.

KNIGHT, BOYCE W., M.B.: THE PROBLEM OF ARTIFICIAL FEEDING. (*American Medicine,* June, 1913.)

An argument for simpler methods of artificially feeding infants, with a view to low cost to the mother and safety to the child, to wit, the elimination of proprietary foods and the pasteurization and sterilization of milk if necessary. The fear of scurvy should not be a deterrent to this treatment of cow's milk.

ELLIOTT, J. H., M.B.: TUBERCULOSIS IN CHILDHOOD. (*American Medicine,* June, 1913.)

Elliott says that 35 to 42 per cent. of all children who die have foci of tuberculosis, a fact which not many suspect. These have been infected after birth from exposure to human infection or by infection from milk, butter, cream—a secondary source. Rothe says that 98.68 per cent. are human infections, while Park thinks 6 to 12 per cent are bovine. During the first year the mortality is highest, being up to 50 per cent.

Glandular tuberculosis is of great importance in childhood, and in the diagnosis of this condition the Roentgen ray is important. The von Pirquet and Moro reactions should be used, but with a judicial mind.

The preventive treatment is important. Children should be withdrawn from infected households and children who are affected with glandular tuberculosis should be guarded from measles and whooping-cough, which are frequently the determining factors in spreading widely the tuberculous infection. The same holds true of acute respiratory catarrhs. Open-air life is the desideratum.

SCOTT, GEORGE DOW, M.D.: FRUIT ADDITIONS TO THE DIET OF THE GROWING CHILD. (*American Medicine,* June, 1913.)

An interesting plea for the addition of fruit, raw and well cleansed, to the dietary of the child, which should be read in order to have a clear idea of its argument.

LEDERLE, ERNST J., PH.D.: PLANS FOR SUMMER WORK IN COMBATING DISEASES OF INFANCY IN NEW YORK. (*American Medicine,* June, 1913.)

A review of the work of the New York City Department of Health. An interesting table is appended showing a decrease in the general death rate per 1,000 births of children under one year from 168 per 1,000 in 1902, to 110 in 1912, and from diarrheal diseases a decrease in rate from a maximum of 48.90 in 1907 to 26.39 in 1912. In 1912 New York City death rate of children under one year per 1,000 births was lower than any city but Rochester.

HASTINGS, CHAS. J., M.D.: THE RÔLE PLAYED BY MILK IN INFANT MORTALITY. (*American Medicine,* June, 1913.)

Hastings cites authorities to show the danger of impure milk as a cause of diarrhea, tuberculosis and the various infectious and cutaneous diseases. The remedy—careful production and pasteurization.

FREEMAN, ROWLAND G., M.D.: PNEUMONIA IN INFANCY. (*American Medicine,* June, 1913.)

Freeman says that there is rarely a lobar consolidation in infancy and that an attempt to base a classification of lung lesions in children upon adult pathology is liable to lead to confusion. Following Dunn a classification might be made of (1) pneumococcal pneumonia, either lobar or lobular; (2) mixed infections; (3) tuberculous similar to (2), but ending fatally. The children who have pneumonia are usually those who are poorly cared for; it being rare in well cared-for children. Fresh air and out-door life are factors in lowering the morbidity of this disease. Freeman recommends neglecting the fever in the treatment, but utilizing warm baths or fresh air if it causes restlessness. Laxatives and strychnin comprise the medicinal treatment and mustard pastes to alleviate the pain. With vaccine treatment the author has no experience. Of his results with a polyvalent pneumococcus serum he has reported elsewhere. (See p. 637.)

BAINES, ALLEN, AND CAMPBELL, GEORGE: ALBUMINURIA IN DISEASED TONSILS. (*American Medicine,* June, 1913.)

In the out-patient department of the Hospital for Sick Children, Toronto, about 800 tonsillectomies are performed yearly. A strict uranalysis for sugar, albumin and acetone is made prior to the anesthetic. The conclusions formed were:—

(1) That 3.2 per cent. of children with hypertrophied tonsils show an accompanying albuminuria with a mild nephritis.

(2) That in the vast majority of cases the pathologic condition rapidly clears up after tonsillectomy.

(3) That the condition is most common during mid-winter and early spring.

(4) Spinal curvature plays a very small part, but, when present, may be an accessory etiologic factor.

SILL, E. MATHER: THE VACCINE TREATMENT OF WHOOPING-COUGH. (*American Medicine*, June, 1913.)

As a result of the use of vaccines in some 46 cases Dr. Sill is convinced that this treatment of whooping-cough is by far the best treatment that we have at our command for the disease, and that not only does it alleviate symptoms and cure the disease quickly, but also in a measure prevents those complications of the disease which are apt to be fatal.

WOODRUFF, CHARLES E., M.D.: CURING DIPHTHERIA CARRIERS WITH STAPHYLOCOCCI. (*American Medicine*, June, 1913.)

This treatment for persistent diphtheria carriers is recommended. The only complications are coryza, mild laryngitis and nasal furuncles. The nose, pharynx and fauces are sprayed two or three times a day with an eighteen to twenty-four-hour culture of staphylococci and it is applied on swabs to the tonsils. Negative cultures have been reported in two to seven days. Apparently there is no antagonism between the two types of bacteria, at least not *in vitro*, and the results may be due to a restoration of the normal flora of the mouth.

SMART, I. T., M.D.: VALUE OF EARLY DIAGNOSIS OF MENTAL DEFICIENCY. (*American Medicine*, June, 1913.)

Early diagnosis means early placing in the proper environment and the greatest possible improvement for the child. Dr. Smart gives certain phenomena and the time of their occurrence as an aid to an early diagnosis.

DISEASES OF EAR, NOSE AND THROAT.

ALEXANDER, GUSTAV: ACUTE SUPPURATION OF THE MIDDLE EAR: ITS NEGLECT AND PROPER TREATMENT. (*Annals of Otology, Rhinology and Laryngology*, March, 1913, p. 159.)

The author, in an article of fifteen pages on an old subject, gives some helpful hints and new lights which are well worth attention. One is to look out for a sudden fall of temperature in the early stages unless accompanied by a subsidence of all other symptoms. This is apt to show the beginning of an intracranial extension in patients of a weak resistance. Little children complain of severe pain in the ear, but which is caused by dentition, tonsillitis or cervical adenitis. A differential diagnosis between otitis externa and otitis media is made under three heads:—

(1) No fever in otitis externa of older children and adults; there may be a moderate rise in the younger children. With much fever, we may assume otitis media.

(2) Good hearing in otitis externa, provided the swollen canal can be opened by a speculum.

(3) Otitis externa always confined to the membranous auditory canal. If we can look through this to the bony canal, normal appearances will be seen.

Course.—(1) The initial stage, from a few hours to four days, accompanied by pain and fever.

(2) Suppuration, drum has ruptured, no pain and but slight fever. This stage lasts from two to three weeks

(3) Final stage, no secretion, perforation gradually closing; in cases that run a normal course, this closing of the perforation always takes place. The prognosis for return of hearing is good, unless there have been chronic changes in the ear prior to the infection and unless there be adenoid growths in the pharynx or tubal catarrh. During this final stage, the mucus secretion may organize, producing adhesive changes in the middle ear. All cases of otitis media with suppuration, which appear in the course of an infectious disease, tend to become chronic.

Complications.—(1) Intra-aural—such as mastoiditis and labyrinthitis.

(2) Extracranial—burrowing abscesses favored by rickets and tuberculosis.

(3) Endocranial—such as pachymeningitis and extradural abscesses and sinus phlebitis.

Treatment.—In the first stage, symptomatic, instillations of warm solutions in ear and early paracentesis if pain continues. The author believes in gauze wicks during the stage of suppuration. When the secretion is very thick, he uses peroxide and gentle aspiration. He cautions against interference during the stage when the perforation is closing. S. W. THURBER.

THERAPEUTICS.

FREEMAN, ROWLAND G.: SERUM TREATMENT OF PNEUMONIA. (*American Journal of Diseases of Children,* December, 1912.)

A report of a series of cases treated in an institution where the children have a poorer reaction than is usual in private practice. The first 7 received 100 c.c. of pneumococcus serum from the New York Board of Health; the last 8 received 50 c.c. each of pneumococcus and streptococcus serum. There was no irritation at the point of injection and no inflammatory disturbance. All were followed by urticaria, but without general disturbance. The average age was twenty months.

There were in many cases an immediate change in the appearance of the children, their color was better, they were brighter and took feedings better. The lung condition was, however, usually unchanged or spreading. In about half the cases there was a reduction of temperature after injection. Where there was a marked reduction in temperature the lung signs did not spread materially and often cleared up quickly.

As to mortality of the 15 injected cases 9 recovered and 6 died, and of the controls 8 recovered and 7 died—40 and 47 per cent. respectively. The injected patients who lived had a much shorter course than the controls. The addition of antistreptococcus serum seems to offer no advantage over the pneumococcus alone.

WM. A. MURPHY.

SURGERY.

DOWD, C. N.: HYGROMA CYSTICUM COLLI CONGENITUM. (*Journal of the American Medical Association,* June 21, 1913, p. 2,025.)

Dowd reports 3 undoubted and 1 other probable case of this rare and very interesting condition. Two of the cysts showed a very marked tendency to growth, one extending into the mediastinum, the other growing under the clavicle and beneath the pectoral muscles. One case recurred rapidly after operation. All cases were treated by excision. One child died in the hospital, and another, shortly after leaving the hospital, of an intercurrent disease.

These cysts are due, according to Dowd, to embryonic sequestrations of lymphatic tissue, with a latent power of very vigorous growth. The cysts are multi-locular, lined with endothelium and occur usually, but not always, in the neck. A careful search of the literature was made and disclosed 91 cases situated in the neck, while 35 cases were found principally in the axilla, but extending in part at least from the neck, also.

CHARLES E. FARR.

BOOK REVIEWS.

THE DISEASES OF THE RECTUM AND PELVIC COLON. By MARTIN L. BODKIN, M.D., Rectal Surgeon, St. Mary's Hospital, the Williamsburgh Hospital and the Howard Orphan Asylum. Illustrations specially drawn by Francis A. Deck. Pp. 416. New York: E. B. Treat & Co., 1913.

This is a very well written, very well illustrated and very well printed book. Dr. Bodkin has gone into his subject with a thoroughness and a simplicity which cannot be too highly commended and gives an impression of knowledge and skill. In a subject which has had only less charlatanism than "diseases of men," it is refreshing to see a text-book so illuminating and indicating so clearly the proper and honest procedures.

DISEASES OF CHILDREN. A PRACTICAL TREATISE ON DIAGNOSIS AND TREATMENT FOR THE USE OF STUDENTS AND PRACTITIONERS OF MEDICINE. By BENJAMIN KNOX RACHFORD, Professor of Diseases of Children, Ohio-Miami Medical College, Department of Medicine of the University of Cincinnati; Pediatrician to the Cincinnati Hospital, Good Samaritan Hospital and Jewish Hospital; Ex-President of the American Pediatric Society and Member of the Association of American Physicians. Pp. 783. New York and London: D. Appleton & Co., 1912.

One realizes how valuable this book of Dr. Rachford's is only after long use and familiarity with it. Having been familiar with his earlier work, "Neurotic Disorders of Childhood," we would expect a work of the highest excellence, as indeed this is. To go into detail in regard to its excellences and its few deficiencies is unessential, for the book demands a place in the library of every physician.

BOOKS RECEIVED.

AMERICAN ASSOCIATION FOR THE STUDY AND PREVENTION OF INFANT MORTALITY. TRANSACTIONS OF THE THIRD ANNUAL MEETING. Cleveland, O., October 2-5, 1912. Baltimore: Press of the Franklin Printing Company, 1913.

As usual, a volume filled with very interesting and important material.

DISEASE IN MILK. THE REMEDY—PASTEURIZATION. By LINA GUTHERZ STRAUS. Pp. 221. New York, 1913.

An appreciation of the work of Nathan Straus by his wife.

THE CHILD. ITS CARE, DIET AND COMMON ILLS. By E. MATHER SILL, M.D. Pp. 207. New York: Henry Holt & Co., 1913.

THE TONSILS AND THE VOICE. IN SCIENCE, SURGERY, SPEECH AND SONG. By RICHARD B. FAULKNER, M.D. Pp. 381. Pittsburgh: The Presbyterian Book Store, 1913.

SOLIDIFIED CARBON DIOXIDE IN THE SUCCESSFUL TREATMENT OF CUTANEOUS NEOPLASMS AND OTHER SKIN DISEASES, WITH SPECIAL REFERENCE TO ANGIOMA, EPITHELIOMA AND LUPUS ERYTHEMATOSUS. By RALPH BERNSTEIN, M.D., Clinical Instructor in Skin Diseases, Hahnemann Medical College, Philadelphia, Pa. Fully illustrated. Pp. 94. Hammond. Ind.: Frank S. Betz Company, 1912.

LES EPANCHEMENTS DU PERICARDE. ETUDE CLINIQUE ET THERAPEUTIQUE LA PONCTION GASTRIQUE DE MARFAN. Par le Dr. GERMAIN BLECHMANN, Ancien interne et médecine des hôpitaux de Paris. Ancien moniteur de tubage et de tracheotomie à la Faculté de Médecine et à l'Hôpital des Enfants Malades. Pp. 325, with illustrations. Paris: J.-B. Baillière et Fils, Editeurs, 1913.

DIE BEHANDLUNG DER KNOCHEN- UND GELENKTUBERKULOSE MIT ORTHOPADISCHEN MASSNAHMEN. Von Dr. F. OEHLECKER, chirurgischer Sekundärarzte. Mit 69 Abbildungen im Text. Sonder abdruck aus den Tuberkulose-Fortbildungskur des Allgemeinen Krankenhause Hamburg-Eppendorf. Band I. Wurzburg: Verlag von Curt Kabitsch, 1913.

DIE EXSUDATIV-LYMPHATISCHE DIATHESE EINE KURZE SKIZZE FÜR DEN PRAKTISCHE ARZT. Von Privatdozent Dr. PAUL SITTLER, Früherem Dozenten für Kinderheilkunde an der Universität Marburg a L. Wurzburg: Verlag von Curt Kabitsch, 1913.

CONFERENCES DE PATHOLOGIE INFANTILE. Par le Dr. GENARO SISTO, Professor agrégéde pédiatrie à la Faculté de Médecine de Buenos Aires. Pp. 215. Paris: Octave Doin et Fils, Editeurs, 1910.

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EDITORIAL.

INFANT WELFARE WORK IN SMALL CITIES.

It is a significant fact that of late the term "infant welfare" has been coming to replace the earlier "infant mortality" out of which it grew. Not that we can consider that the mortality of infancy can be regarded as conquered, but that the widespread efforts which have resulted from the attempt to stop infant death have shown that we must go farther and give the surviving 75 per cent. a chance to live. Half a loaf is better than no bread, perhaps, but how much more than 50 per cent. better is an able-bodied, competent-minded individual than a weakling, a defective! We should produce the 80, 90, 100 per cent. efficient individual, and toward his production we should all strive. So much has been done; so much can yet be done to bring up to standard the 80 per cent. who survive, that for all time to come infant welfare and child welfare must be active interests, whatever may be the drop in the mortality rate.

Some of the larger cities of the United States have brilliant records in this last, New York City particularly. To bring the death rate per 1,000 births down from 162 to 105 in four years is a wonderful piece of work and one of the most stimulating aspects of it is that if you ask those who are in large measure responsible for this result what has done it, they will not give greatest credit to what has been due to the work of the minority, aided by the admirable machinery of the Health Department, the thing which New York City by virtue of its being a great city and supplied with all the complicated machinery necessary to the handling of great numbers of people living in close contact could accomplish more easily than a smaller place, namely, the securing of a purer milk supply, but will tell you that "in the prevention of infant mortality *education is 80 per cent. and milk 20 per cent.*" Not every city can have so good an average quality of milk as the cities of the first class, for the initial expense to inspect farms, dealers, deliveries, etc., is too great to contemplate unless this overhead be distributed over a large number of individuals. This is one of the ways in which city life, entailing as does augmented dangers from close personal contact and limitation of fresh air and sunlight, yet does admit of a better sanitary system and of reforms which are almost impossible in small cities without a greater proportionate increase in the cost of living. But education can be had and given as well in small towns as in large, and at no greater—perhaps at less—expense.

Education in the care of children with a view to their welfare is necessary in the small cities. They have been outstripped in the race toward proper sanitary conditions by the larger communities, as the death rate figures in New York State show. Commonly, the small town and the country are regarded as being more healthful than the city. Life there is, indeed, simpler and the chances for dissemination of disease by contact somewhat less; but every fall sees typhoid brought back by sojourners in the rural districts, and frequent epidemics of contagious disease are notably the lot of the small city. The total number of cases in these epidemics may not be greater than in the epidemics of large cities, but to each individual home the danger is more intimately menacing and seems greater because better known. The reason for these typhoid outbreaks and epidemics is that the villages and small towns operate under the simplest kind of mechanism, in which the factor of safety is not great nor elastic and is easily broken down by overcrowding. The small city is particularly unfortunate in this regard. Often, not having the population to justify a proper installation of sewers, a pure water supply, a comprehensive health department, with milk inspectors, building inspectors, quarantine officials, etc., it has yet lost the virtue of the true open country, where neighbor is remote from neighbor and the sanitary sins of one are less likely to be visited upon his neighbor's children. In these cities are often to be found worse sanitary conditions than in the slums of their great counterparts, as their infant death rate will show. They are betwixt and between, neither fish, flesh nor yet good red herring.

To these cities there should come, as has come to some of the cities of the second class in New York, infant welfare associations, milk stations (run, perhaps, as in Utica, by Dr. T. Wood Clarke in rooms of school buildings), supported by popular subscriptions at first, but with the idea of public support later; visiting nurses, volunteer visitors in the homes of the poor, antenatal visiting, relief work, ice distribution, vacation planning, convalescent homes, but all the time, first and last, education. Teaching at the milk station, teaching in the home, teaching at church, at the school, at Boy Scouts' camps, at Camp Fire Girls' meetings—everywhere there should be teaching. And the community spirit, which the small town has and the big town lacks, should quite offset the lack of wealth.

Here, then, is a field, a large one and an important one, important alike to the small cities themselves and to every community with which their citizens come into contact. We hope that at the fourth annual meeting of the American Association for the Prevention of Infant Mortality, which is to be held in Washington in November, the condition of the smaller cities may be adequately taken up to the end that the formation of welfare associations in those cities may be stimulated and that such associations as have already been working may be encouraged.

ORIGINAL COMMUNICATIONS.

DANGEROUS MIDDLE EAR SUPPURATION.

BY IRVING WILSON VOORHEES, M.S., M.D.,
New York City.

The purpose of this paper is merely to give in brief outline the salient features or points which will enable a general practitioner to recognize dangerous middle ear conditions and will lead him to act promptly before the disease process has gone beyond help.

During the past decade otology has made great strides in the treatment of these so-called complications of middle ear diseases. It is coming to be recognized, for instance, that most brain abscesses are of otitic origin and that these are best treated by the aurist, since he is quite familiar with the anatomy and the course and prognosis of such cases. The otologist has advised that a temporal lobe abscess, to cite an example, should be drained, not through the exposure afforded by an osteoplastic flap, as is the custom of the general surgeon, but it should be drained by removing the roof of the tympanic cavity and antrum, because in this way the exposure is much better and the pus drains from a dependent point and not "uphill," as is usually the case in the general procedure. The results secured by the aurist are now relatively good in such cases, and when the early symptoms of a like condition are kept in mind by the family physician early diagnosis and prompt operation will save a large percentage of these patients.

Let us consider the causes which lead to these complications of middle ear suppuration. As is well known, children are frequently subject to attacks of acute middle ear disease which are prone to become chronic. The reasons for this fact are: (1) The Eustachian tube is short and has a wide opening in the pharynx; (2) changes in circulation due to the mechanism of labor with hyperemia and puckering of the tympanic mucous membrane; (3) the embryonic character of the tympanic mucous membrane and its persistence after birth; (4) the immaturity of the child, premature birth, etc.; (5) hereditary constitutional diseases, such as scrofula, tuberculosis, syphilis, rachitis and alcoholic heredity; (6) traumatic injuries of the middle ear before and during birth, invasion of the liquor amnii and parts of the fetal membranes into the middle ear; (7) infectious diseases; above all, grippe; less often, measles, whooping-cough, varicella, diphtheria and scarlet fever, in the course of which coughing, sneezing and vomiting may produce an infection of the middle ear through the Eustachian tube; (8) hematogenous infection, which is carried to the ear through the blood and lymph streams from other parts of the body; (9) stomach disease and brain disorders, which lead to middle ear infection because of vomiting.

Therefore, if a child has fever and no apparent cause can be found, the ear must be carefully investigated. It should be remembered that the drum membrane of a young child is relatively thicker and more resistant than that of adults; hence, an acute suppurative otitis media, if undiscovered, may last one or two weeks before perforating, during which time the child suffers severely and shows the symptoms resultant from such a condition. The danger from otitis media is greater in artificially-nourished than in breast-fed children.

Owing to imperfect drainage and poor resistance on the part of the child, these acute middle ear conditions have a strong tendency to become chronic, and even when treated skillfully, both by medical means and by surgical operation, we may fail to cure the discharge.

Chronic suppuration is one of the commonest of middle ear diseases. In itself, it is not dangerous, since it may continue for many years without producing any disturbance other than a foul-smelling discharge, which the patient usually treats himself by means of drops, irrigations, or sponging the canal with bits of cotton. The great danger, however, of this condition lies in the fact that all unknown caries, necrosis, osteosclerosis and stagnation and decomposition of pus may be going on with ultimate destruction of the ossicles (hammer, anvil and stirrup) and sequestration of bone from the attic or antrum giving direct access to the brain or labyrinth or sinus. When such erosion and destruction of bone has gone on to a sufficient depth a pathway is opened for any new germ which may be introduced as a result of an acute infectious disease. This newly introduced organism, finding a suitable soil for its propagation, breaks down the slight barrier between it and the vital structures and produces some complication which is immediately dangerous to life. These cases, fortunately, are in this country not so frequent, since our patients take better care of their general health than is common in continental Europe, and at the first signal of alarm go immediately to the family physician or specialist and secure the necessary advice and treatment. In Europe, however, the peoples inhabiting certain provinces of Russia, Turkestan and the outlying provinces of Italy and Austro-Hungary, are remote from centers of efficient medical service and are obliged to live under extremely unhygienic surroundings because of their poverty. Moreover, the economic value of a life in these countries is often considered by the poor peasant to be less than that of his horse or his cow, and it sometimes happens that when a child dies the parent feels that a burden is removed from his shoulders.

Consequent upon the pathologic changes enumerated above, there are enlargement of the submaxillary and cervical glands, localized headache, fullness in the ear, and heaviness in the head. If the patient is a child he becomes "run-down," is mentally dull and loses appetite and weight. Adenoids are practically always present in such cases, and the tonsils are enlarged. In fact, adenoids are probably the greatest single cause of primary ear infection which we know.

In about 80 per cent. of chronic diseases of the bone in otitis media, the suppuration continues in spite of conservative treatment, necessitating surgical operation. We may, however, have a severe middle ear disease with slight symptoms, or no symptoms whatever.

The symptoms of chronic middle ear suppuration both in adults and in children are briefly as follows: (1) A foul discharge, now profuse, now scanty, stopping perhaps for some time only to begin again upon the slightest provocation, such as an acute rhinitis. (2) Small pieces of bone in the discharge, which are, of course, the result of necrosis in the tympanic cavity. (3) So-called cholesteatomatous masses in the discharge. These are simply masses of epithelial debris, pus cells, pyogenic organisms, cholesterin crystals, fat globules, etc. Patients showing these masses are in danger and should be submitted to operative procedure as soon as the diagnosis is made. (4) Polyps in the external meatus are often felt by the patient. (5) Blood from the external meatus, seen by the patient if granulations break down, or if a small vessel is eroded. (6) Headache: This is an important symptom, especially if limited to the half head or about the eyes. If about the eyes, there may be a deep abscess in the posterior fossa of the skull, either extradural or cerebellar.

Such symptoms can usually be elicited without difficulty if the patient's history is carefully gone into. (7) Nausea, especially when suddenly changing the position of the body, for instance, upon getting out of bed. (8) Vomiting, which may occur daily or at longer intervals. (9) Dizziness, which, if combined with a sensation of turning or with the sensation of surrounding objects being turned, is a very important symptom of labyrinth involvement. (10) Nystagmus of the eyes, which is important in connection with other symptoms and should always be looked for by the physician. It consists in a bilateral rhythmic, associated movement of both eyes, is most frequently horizontal and directed to the right or left or both sides of the body. (11) Facial paralysis present only if the facial canal is eroded. It is frequently transitory, disappearing after operation.

The complications of middle ear suppuration arise whenever the suppurative inflammatory process extends beyond the normal anatomic territory of the middle ear, that is, in any of the directions already mentioned. We shall not attempt to consider these in detail, but only take up some of the salient features as they are evidenced by local and general symptoms.

If, in a patient with chronic middle ear suppuration, there is headache, rise of temperature, pain behind the ear with signs of acute exacerbation of an old middle ear condition, a specialist should be consulted at once.

Even more dangerous than a profuse discharge is scanty discharge. If an ear has previously been discharging profusely and suddenly ceases, and if the patient has at this time increased discomfort, headache, sleeplessness and the train of symptoms mentioned above, he is in danger. Paralysis of the eye muscles and choked disc are seldom seen, save in cerebellar abscess, which is one of the most difficult conditions to diagnose before operation.

The most important complications of chronic middle ear suppuration are acute mastoiditis, brain abscess, labyrinthitis and sinus thrombosis. The symptoms of these conditions need not be described in detail.

Symptoms of suppuration in the labyrinth are nystagmus of the eyes, deafness, disturbances of equilibrium, nausea and vomiting and sometimes paralysis of the facial nerve. The symptoms of sinus thrombosis are pain and tenderness behind the posterior limit of the mastoid process following the general course of the lateral sinus, and a temperature of 104° to 105° F., with sudden rise and fall. The other symptoms of sinus thrombosis are mainly those which are to be found in general septicemia.

Cerebellar abscess has no cardinal symptom, but diagnosis here depends for the most part upon a previously existing labyrinthine suppuration, disturbances in gait, paralysis of the sixth nerve and occasionally choked disc. The patient usually staggers toward the affected side, and the nystagmus is stronger toward the affected side.

When in an acute mastoiditis considerable swelling and pain are found in the neck below the mastoid tip, it is likely that pus from the mastoid has perforated the tip and formed a so-called Bezold abscess between the neck muscles.

Symptoms demanding operation include some of those already outlined, especially the more severe symptoms, such as vomiting, dizziness with turning, nystagmus and facial paralysis. If there is an increase of temperature in a patient who has shown previously merely the signs of an acute middle ear condition, and if this patient be a child in which the temperature rises to 103° or 104° F., it is suspicious of an operative condition. Moreover, if such a temperature remains constant, with free discharge from the canal, the indication is more serious than would otherwise be the case. Localized pain in the head, especially if limited to the half head, is always to be taken into account, since it may mean an exposed dura. The patient is restless, especially at night, does not sleep, has loss of appetite, chills, sometimes delirium, and, if a sinus condition is present, icterus may also be found. This is an important symptom and should always be looked for. Moreover, if the patient objects to moving the head and neck and manifests discomfort, together with tenderness along the cervical vertebræ, this does not always mean meningitis, but is spoken of as "meningismus." Finally, an absolute indication for operative interference is sinking of the postero-superior wall of the external canal combined with mastoid tenderness.

In making a differential diagnosis of mastoiditis from other complications of middle ear disease, one frequently has to consider furunculosis. In furunculosis the pain is situated in front of the external canal. The canal itself is swollen and the tenderness is so exquisite as to prevent examination. It is impossible to see the drum. This tenderness may also manifest itself behind the ear, and in such case one should be very careful in making a diagnosis, since a mastoiditis may in reality be present together with a furunculosis. A furuncle is caused very frequently by a discharge of pus from the middle ear which flows over the numerous glands in the external canal, infects them, and produces an abscess. This abscess always occurs in the so-called cartilaginous portion of the canal.

When the furuncle is cured one will be able to investigate the deeper portion of the canal and the condition of the drum, which will serve as an aid in determining whether mastoiditis is really present or not. Another help to the specialist in making a diagnosis of mastoiditis is transillumination of the mastoid by means of special lamps inserted into the external auditory canal. I have modified the apparatus of Dintenfass, of Vienna, and am studying the comparative findings before and after operation in cases of mastoiditis.

It is not advisable nor would it be possible to enter into a detailed description of other complications of middle ear suppuration. These are matters for intensive study by the expert otologist, who will find his resources frequently tried to the utmost both in diagnosis and in the successful management of such cases. But the great effort of every practicing physician should be directed toward prevention of these complications through a keen realization of the possibilities attending delayed diagnosis and delayed surgical intervention.

We all recognize the importance of early diagnosis. Diagnosis is one of the hardest problems which presents itself to the medical mind for solution, no matter what the field be in which the physician is especially interested, but the important point which I wish to emphasize is that, given a patient with a discharging ear, whether acute or chronic, if there is pain in the head, sleeplessness, disturbances of vision, loss of memory, nausea and vomiting, nystagmus or facial paralysis, one should not be content with prescribing a headache powder or a stomach mixture, but should refer the symptoms back to the probable cause in the ear. Fortunately most American physicians have their patients under observation and control until all danger signals are safely passed; therefore, good judgment and prompt action will save many of these patients long, weary weeks of convalescence and may prevent untimely fatalities.

14 Central Park West.

VULVOVAGINITIS IN YOUNG CHILDREN: ITS CONTROL AND SUCCESSFUL TREATMENT.*

BY NATHANIEL BARNETT, M.D.,
New York.

The frequency of vulvovaginitis among children, and its unsatisfactory treatment in the ordinary dispensary services in New York, suggested to the authorities of Mt. Sinai Hospital the establishment of a special clinic for the treatment of this disease. The purpose was to determine how much could be done to help these unfortunate sufferers, as well as to educate the parents in the methods of modern prophylaxis. With this end in view the writer was placed in charge of this class in the Mt. Sinai dispensary, and through the liberal support of the executive department of the hospital has made the following studies, extending over a period of one year.

Vulvovaginitis has always been prevalent in hospital services, and no one has as yet been able to explain its spread or the exact mode of infection and why it is so difficult to control. We have, however, succeeded in throwing some little light on various points. We find it to be exceedingly prevalent in hospitals, especially if no effort is made to isolate the individual child. And in schools where children use a common toilet the spread of the disease is favored. It is an unfortunate fact, too, that in the homes of the poor, owing to unavoidable crowding of children and adults, there is an element most favorable to the spread of this disease. It would carry me too far to analyze these modes of infection, which must be recognized at once by all students who have given the subject any thought, but this paper will deal more especially with the treatment of the affection as we find it and prophylactic measures which have suggested themselves to us.

When I took charge of the special clinic I found very little in the literature to encourage me in my work. It seemed that few writers had studied the disease thoroughly. My own material consisted of 50 cases.

The Nature of the Service.—The method of procedure was to establish a class conducted in such a way as to favor the principle of considerate treatment of the patients. Two nurses were always at hand—one to assist in the treatment, the other to take notes, and, if necessary, subsequently to do social welfare work. I first began by attempting to formulate the best mode of examining all these patients. The methods suggested in a paper written by Dr. Koplik in 1893 were, in the main, adopted. A Skene urethral speculum was utilized to inspect the vagina and cervix, together with the aid of an electric mirror. Spreads of the secretion were taken before the various therapeutic procedures were instituted. In this way every case was carefully examined, studied and treated. Attendance at the clinic was required three times a week, and the nurses visited the homes and urged the delinquent ones to attend regularly. At the same time the home conditions were looked into; attempts were made to have the children isolated, *i.e.*, sleep alone, to carry out treatment as directed, and to supervise and improve home conditions. In spite of this, many mothers could not spare the necessary time to bring the patients to the clinic for a long period, and so, of 50 cases, only 26 continued systematic treatment.

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* Presented at the meeting of the New York Academy of Medicine, Section on Pediatrics, May 13, 1913. From the Special Vaginitis Clinic of Mt. Sinai Hospital Dispensary.

Etiology.—Vaginitis in itself is only serious when complications develop. In many cases, as formerly treated, a few words of caution were given the mother, besides advice to give the child douches. We tabulated our cases as to etiology as follows:—

1. Discharged from hospitals and other institutions...	18	cases
2. Sleeping with mother, who had a vaginal discharge..	9	“
3. Sleeping with sisters, who had a vaginal discharge..	5	“
4. Cases of unknown origin......................	18	“

Many of the cases seen at the dispensary occurred in families where two or more children slept together, or with the parents. Owing to social conditions this was unavoidable. In the majority of cases the disease was discovered accidentally by the mother or the physician and the source of infection could not be traced.

Duration.—The disease is of varying duration. Some of the patients gave a history of recent origin, in others the disease had lasted for years—in one case fully six years, with a positive gonococcus finding in the secretions of the vagina. It can thus be seen that the chronicity and resistance to treatment of the affection is characteristic. The shortest duration of any case before coming under our observation was one week. The average duration was eight and one-half months.

Diagnosis.—Our method of diagnosis is as follows: The patient is placed on the back on a bed-pan, the labia widely spread, a platinum loop is introduced into the vagina as far as possible —about one and a half to two inches. In small children by keeping well to the posterior wall of the vagina no difficulty is encountered in the introduction of the platinum loop. The floor and walls of the vagina are gently scraped and the secretion obtained spread on a slide and stained with Gram.

Seat of the Disease.—In most cases a small amount of dried pus, or secretion, is found on the labia, and pus is seen coming from the orifice of the vagina, but the external appearance of the hymen may be normal in a pronounced gonorrheal process. If the opening in the hymen is small, a varying amount of pus is usually found just behind it; the vagina is dull pink, with pus usually present in the folds of the rugæ throughout its entire length and occasionally hemorrhagic spots are seen in the walls of the canal. In the cervix we find marked changes. It is in all cases deeply congested and pus is seen exuding from the cervical canal. Superficial ulcerations are occasionally observed on the anterior and posterior lip. The cervical orifice varies somewhat in size, and especially in different children at the same age. In some there is a slit-like orifice; in others a circular, or gaping, orifice. The size of the orifice and the neck of the cervix has no relation to the age of the child. The posterior fornix in other cases contains a certain amount of pus which bathes the cervix continually.

These observations conform with those made by Koplik in 1893. He states: "If a Tuttle urethral speculum be passed into the vagina and light thrown into the same by means of a head mirror, it is seen to be the seat of intense inflammation like the vagina in an adult gonorrhea. It may be the seat of erosions that bleed easily. The cervix is reddened and bathed in pus and in the opening of the cervix we find a drop of pus. This cervical involvement I have seen in all cases I have examined in this way. The course of the disease is tedious and resists most methods of treatment. I have never seen a case in which I could say that the urethra alone was affected. I have come to believe that the urethra, the nymphæ, hymen, vagina and uterus are all the seat of gonorrheal diseases, and one of the chief causes of the intractable nature of vulvovaginitis is the fact of the involvement of the vagina and cervix, especially the latter." In nearly all cases complaining of vesical tenesmus and burning sensation on urination I took urethral smears and these, without exception, were negative.

Complications.—In my series of cases the following complications were present:—

Arthritis of the shoulder	1
Arthritis of the wrist	1
Chronic general peritonitis	1
Pelvic peritonitis	2
Painful heel	1

The patient in the latter case was eleven years old and an X-ray showed a periosteal exostosis.

Burning sensation on urination, 30 per cent. of the cases.

TREATMENT.—The treatment of vulvovaginitis in the past may be formulated as follows:—

1. Irrigations.
2. Installations.
3. Local applications.
4. Vaccines.
5. Illumination of the vagina with the speculum and treatment of the parts locally.

In addition to the above I have applied the electric endoscope, which I think is a distinct advance in the management and treatment of these cases.

Irrigation.—To irrigate the child is placed in the dorsal position on a bed-pan. A soft rubber catheter is introduced into the vagina as far as possible, and about a quart of the solution used is allowed to flow in slowly and escape. The solutions I have used were potassium permanganate, 1-1,000; bichlorid of mercury, 1-4,000; Lugol's solution of iodin, 1-500. The alcoholic solution of pure iodin cannot be used even in 1-20,000 strength without causing pain and great discomfort.

Installations.—The child is placed on the bed-pan and the buttocks raised and 1 or 2 grams of the medication injected through a small catheter and retained three to five minutes. The solutions used were nitrate of silver ¼ per cent. and argyrol 10 per cent.

Applications.—Medication introduced with a cotton applicator and the vaginal wall swabbed. Nitrate of silver, 10 per cent., was used.

Vaccines.—Fourteen cases were treated with vaccines at intervals of three to seven days in doses of from five to one hundred millions. The injections were generally made in the buttocks.

Each of the above methods received a most painstaking trial, and I have finally adopted the following mode of treatment: The mother is instructed at the clinic in the method of giving the vaginal douche and in preparing the permanganate solution, 1-10,000 or thereabouts. This injection is to be given in the homes daily. The patient is put on small daily doses of urotropin. In the clinic the patient is treated with the electric endoscope. The child is placed on the bed-pan in the dorsal position, the foot of the table being raised to an angle of 30 degrees. This causes the cervix to come in line with the endoscope and simplifies the treatment:—

(*a*) The external genitals are sponged off and the labia separated; (*b*) the Kelly endoscope is inserted as far as possible, the size of the endoscope depending on the size of the opening in the hymen and not on the age of the child. An endoscope of proper size should cause no pain—this is of the utmost importance. After one or two sittings the little patients will allow this procedure quite readily; (*c*) the obdurator of the endoscope is withdrawn, the light inserted, and with no other manipulation than withdrawing the tube one-quarter to one-half inch the cervix presents at the distal end of the tube; (*d*) any secretion is then removed with the applicator, and iodin (Lugol's solution) is applied directly to the cervix and vaginal walls as the endoscope is slowly withdrawn. These endoscope treatments are carried out three times a week.

Ultimate Results.—With all methods of treatment the discharge soon ceases, but this of itself does not constitute a cure, for smears may remain positive for months after all visible discharge has ceased. Two negative smears at intervals of two weeks may be followed by positive ones so far as gonococci are concerned. One of my cases under observation for ten months has never had a visible discharge, but smears taken from the secretions of the vagina and the cervix have been repeatedly positive. A smear taken from the posterior fornix may be positive, whereas the secretion obtained at the same time near the hymen may be negative.

Butler and Long, as well as Churchill and Soper (1908) and

Hamilton (1910), report good results from the use of vaccines. Most other writers, including myself, have been unable to confirm these results. *None* of my cases treated with vaccines *showed any improvement* as to the vaginal discharge.

As to the complications, both cases of arthritis showed rapid improvement with complete cure of the arthritis following the use of vaccines, but the vaginal discharge did not diminish in either case, and the vaccine treatment was therefore suspended in both cases.

In both cases of pelvic peritonitis treatment was suspended for an indefinite period. No vaccines were given in these cases.

The painful heel was improved by the vaccine treatment, but at times there was a recurrence of severe pain at varying intervals.

I consider cases cured if smears taken weekly are negative for three consecutive weeks. The patients even then must return monthly for examination in order that smears may be taken.

Conclusions.—Twenty-six cases are the material from which I deduce my conclusions. Of these cases only 7 can be said to be cured at the end of six months by irrigation alone. Seven of these cases after irrigation had failed have been treated with the endoscope, and 5 of these were cured in one month. Five additional cases of the 26 which had failed to improve on irrigation are now being treated with the endoscope and are rapidly improving.

General Conclusions.—The first important fact to bear in mind in treating this disease is the infection of the cervix and the difficulty of reaching this nidus of infection by the ordinary methods of treatment. Any infection of the cervix is difficult to treat because of its inaccessibility in the child. The simplest method of treatment, namely, irrigation of the vagina, is neither practical nor of great value. The affected parts are not reached directly, and the treatment must be continued for too long a period of time, and even then the results are unsatisfactory, because the solutions used in irrigation are not of sufficient strength. Direct applications must be made to the deep point of infection, and this is the ultimate practical point of this paper. Cures can be obtained by the treatment of the cervix, as I have indicated, in a short period of time, and strong solutions can be applied to the cervix and vaginal walls directly without causing any pain.

Prophylaxis.—The prophylaxis of this disease is very difficult to carry out at home, but the following points should be insisted upon—children should sleep alone; they should have marked linens and underclothes, which should not be used for the other children even after they are washed. They should wear a vulva pad, which should be frequently changed. They should spread paper on the toilet seat, and they should keep their hands away from the genitals. In the schools separate toilets should be provided for these children, and this can only be carried out by invoking the aid of the Board of Health, and subsequently that of the teacher, so that these children may be controlled. Teachers and social workers should be taught that this disease is always present among children; they should be taught that there is such a thing as a vaginal gonorrheal discharge, and that its method of acquirement in most cases is innocent.

Such teaching will go a great way toward doing away with the concealment on the part of parents of the presence of the disease.

In closing this paper I desire to express my thanks to Dr. Koplik for many valuable suggestions and encouragement, and to Dr. Bernstein and Dr. Junger for the bacteriologic work, and to the nurses of the Social Welfare Department of the Hospital for their able assistance in handling these cases.

REFERENCES.

Koplik. "Urogenital Blenorrhea in Children," Journal Cutaneous and Genito-Urinary Diseases, 1893.
Butler and Long. Journal American Medical Association, 1908.
Churchill and Soper. Journal American Medical Association, 1908.
Hamilton. American Journal of Obstetrics and Diseases of Women and Children, 1910.

TONSILLITIS FOLLOWING STAPHYLOCOCCUS TREATMENT OF DIPHTHERIA.—Clara M. Davis, Lansing, Mich. (*Journal American Medical Association,* August 9th), reports a case of severe tonsillitis following the use of staphylococcus spray for diphtheria. The patient was instructed to spray the nose and the throat three times a day with a pure culture in sterile normal salt solution. The tonsillitis symptoms appeared on the second day and smears showed abundant staphylococcus growth with a few diphtheria bacilli on the third day of spraying. Five days later the diphtheria bacilli had disappeared, but there were numerous staphylococci, and a few pneumococci and streptococci. The tonsillitis attack was much more severe to the patient subjectively than the diphtheria.

COMPLEMENT FIXATION TEST FOR GONORRHEA.*

BY ARCHIBALD McNEILL, M.D.,
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The technique of the complement fixation test for gonorrhea is identical with that of the Wassermann test for syphilis, with the exception that antigens prepared from pure culture of gonococci are used. In cases of anterior gonorrheal urethritis in the male and acute vulvovaginitis in the female a positive reaction is practically never obtained. But shortly after the posterior urethra in males and the cervix and glands of Bartholdi in females are involved the serum of the patient reacts positively.

After having tested between 3,000 and 4,000 sera taken from persons suffering from all stages and varieties of gonorrheal infection, the results seem to justify the assumption that a positive reaction denotes the presence of recent activity in the body of a focus of living gonococci.

A positive reaction usually persists for from six to eight weeks after a cure has been effected. It has also been found that antibodies disappear from the blood of rabbits immunized to gonococci in about the same period.

With regard to a negative reaction, it would seem that one negative result should not be accepted as conclusive evidence of a cure, but when persistently negative results have been obtained extending over a considerable period of time, it seems safe to assume that a cure has been effected.

The serum from the following 8 cases was obtained through Dr. Hess from one of the local infant asylums. All these children have a history of vulvovaginitis:—

	Time of infection.	Discharge at present time.	Smears.	C. F. test.
Case 1	1 year ago	none	——	++++
Case 2	1 year ago	none	Pus—?	++
Case 3	2-3 years ago	none	Pus—?	++++
Case 4	1 year ago	none	——	++++
Case 5	1 year ago	occasional	——	++++
Case 6	2 years ago	none	——	++++
Case 7	1 year ago	offensive	——	+
Case 8	1 year ago	none	Pus—?	++

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* Presented at the meeting of the New York Academy of Medicine, Section on Pediatrics, May, 1913.

These tests were properly controlled and were performed in duplicate to insure accuracy of technique.

The above tests are far too few in number to allow of very definite conclusions being drawn. However, they at least show that infantile vulvovaginitis may be more than simply a local infection and that the infection may be active after all local manifestations have disappeared. In acute cases of vaginitis, where the blood test is negative and there is any doubt with regard to the identification of the gonococcus as the causative organism, antigens may be prepared from pure cultures of the suspected organism from the case and tested against a known antigonococci serum.

This test is very specific. With the present method of preparing bacterial antigens there is no cross fixation even with a gonococcus antigen and an antimeningococcic serum or with a meningococcus antigen and an antigonococcic serum.

A New Method of Treatment for Gonorrheal Conjunctivitis.—Goldzieler has found, like others, that the treatment of this disease in adults is very satisfactory; the classical treatment by nitrate of silver or the organic salts does not save the cornea in the majority of cases. He has in three months treated 15 cases by hot vapor, with results that are most gratifying. (*Archives d'Ophthalmologies,* Vol. XXXII., No. 3.) The gonococcus is only found on the surface of the conjunctiva and rarely penetrates into the subepithelial layers. The organism is destroyed by very moderate high temperatures; at 44°C. it dies in ten minutes; at 45°C. it is killed instantaneously. He concluded. therefore, that the application of moist heat would be an efficient remedy, and has now constructed a simple apparatus for applying steam to the conjunctiva. From a small boiler there is, at right angles, a short tube to conduct the vapor; the water is heated by electricity. The patient is placed on a couch, the conjunctiva of the lids exposed and the steam applied directly after the sac has been carefully washed out and dried, and the surrounding parts protected by gauze. At a distance of 4 cm. the steam is at a temperature of 45°C.; at 2 to 3 cm. it is 52°C. This is the temperature which he prefers. The treatment is rather painful at first, but becomes much less so after the first application.—*The Universal Medical Record.*

RADIOGRAPHIC STUDIES OF THE CHEST IN TUBERCULOUS MENINGITIS.

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This report is based on 15 cases of tuberculous meningitis from the children's medical wards of Bellevue Hospital. These children were admitted during the last four months. In all of them radiographic examinations of the chest were made, and it is with a study of these especially that this paper is concerned. I am indebted, for the privilege of presenting these cases, to the courtesy of the attending physician, Dr. La Fétra, and for the lantern slides of the plates to the cordial coöperation of Dr. Hirsch, who has kindly consented to show and interpret some of the slides at the close of the paper.

The idea of the routine examination of the chests of cases suggestive of tuberculous meningitis, first suggested itself to me from a study of the plates taken in a number of cases of suspected early pulmonary tuberculosis. I was desirous of ascertaining whether this measure could be relied upon as an aid in the diagnosis of tuberculous bronchial glands and early pulmonary infection, and lacked the means of checking up the radiographic findings. It seemed that tuberculous meningitis might give a series of cases ideal for this purpose, as a fair proportion would probably go to the necropsy table; and a study of the autopsy records at the hospital of this disease showed that in the chest these existed in all stages of tuberculous infection, from rarely the mere involvement of the lymph nodes to a general miliary infiltration of both lungs. Not only could one learn if the X-ray could be relied upon to diagnose early tuberculous infection of the bronchial glands and early infiltration of the lungs, but one would here have the opportunity of ascertaining to what extent, in those cases showing pulmonary involvement, the interpretation of the radiographic shadows corresponded with the pathologic lesions present.

Moreover, as a review of these autopsy records showed a pulmonary involvement beyond an incipiency in 88 per cent. of

Case Number	Days in Hospital	Age	Sex	Exposure to Tuberculosis	Previous Diseases	Duration of Disease	Pulmonary Signs	von Pirquet test	SPINAL			
									Amount	Pressure	Cells per c.c.	Percentage of Lymphocytes
1. E. B.	2	2 years 9 mos.	F.	O	Measles and whooping cough 2 years ago.	21 days	Moist râles at right apex posterior.	+	60 c.c.	+	437	89
2 C. P.	6	6 years	M.	O	O	20 days	No abnormal signs.	neg.	40 c.c.	+	340	99
3. J. W.	4	6 mos.	M.	O	O	15 days	Fine râles at right apex posterior.	neg.	40 c.c.	+	288	91
4. J. C.	9	9 mos.	M.	O	O	?	Few râles at right apex and right axilla.	+	50 c.c.	+	110	?
5. F M.	3	5 years	M.	O	Measles 2½ years ago.	24 days	Right apex anterior and posterior and right axilla, very harsh breathing.	neg.	30 c.c.	+	260	?
6. C. G.	5	20 mos.	M.	O	Measles 5 mos. ago. Ill since.	?	O	+	30 c c.	+	?	60
7. M. H.	4	8 mos.	F.	Yes father	O	?	Fine râles at both nipples.	neg.	35 c.c.	+	400	?
8. R. S.	12	4 years	F.	O	Measles 5 weeks ago.	12 days	O	+	30 c.c.	+	280	73
9. M. S.	6	18 mos.	M.	O	O	?	At angle of left scapula is inc'd voice with a few fine râles.	+	35 c.c.	+	380	?
10. J. C.	11	9 years	F.	O	O	21 days	O	neg.	45 c.c.	+	215	?
11. G. A.	6	15 mos.	F.	O	O	17 days	O	neg.	40 c.c.	+	35 1st c't 65 2d c't	100
12. S. M.	12	8 mos.	M.	O	Cough for 4 months.	15 days	Dullness and broncho-vesicular breathing right base, harsh breathing left upper lobe.	+	10–30 c.c.	not inc'd	215–400	?
13. E. M.	8	15 mos.	M.	+	O	15 days	Slight dullness and diminished breathing over both lower lobes.	+	15 c.c.	O	102	?
14. M. L.	7	5½ yrs.	M.	O	Measles and whoop. cough 1 year ago.	22 days	O	+	15 c.c.	+	280	65
15. J. F.	11	9 mos.	M.	O	O	3 mos.(?)	O	+	25 c.c.	slight	220	?

FLUID						RADIOGRAPHIC REPORT OF CHEST	POST MORTEM RECORD
Kaplan	Noguchi	Fehling's	Film	Clear or Cloudy	Tubercle Bacilli		
+	?	O	?	Clear	Not found	One or two shadows suggesting enlarged pulmonary lymph nodes; tuberculous infiltration of right lower lobe.	Tuberculous meningitis; lungs and thoracic lymph nodes show no tuberculosis. Bases congested: purulent bronchitis, lower cervical glands enlarged and caseous.
+	?	+	+	Clear	Not found	Pulmonary lymph nodes enlarged. From the very distinct markings probably a tuberculous broncho-pneumonia of the right lower lobe.	Tuberculous meningitis; lungs and lymph nodes show no tuberculosis.
+	+	+	+	Clear	Not found	Scattered areas of tuberculosis both lungs. Consolidation of right apex with probable cavity formation.	*Right Lung*—Beneath pleura and on cut surface miliary tubercles. In upper lobe are one or two areas ½-2 cm. in diameter of consolidation. No cavity formation. *Left Lung*—In upper lobe several areas of tuberculous consolidation. The apex is adherent and contains a cavity 3 cm. in diameter. T.B. Meningitis.
+	O	O	?	Clear	Not found	Marked infiltration consisting of discrete areas distributed over both lungs. Areas of consolidation in right upper and middle lobes.	Tuberculous meningitis; scattered tuberculous broncho-pneumonia.
+	?	O	?	Clear	Not found	Partial consolidation of lower part of right upper and middle lobes.	Tuberculous meningitis. *Right Lung*—Few adhesions over middle and upper lobes; numerous conglomerate tubercles beneath the pleura. *Left Lung*—No tuberculosis; dense adhesions at base. Bronchial glands not tuberculous; tracheal glands involved.
+	?	O	?	Clear	Not found	Small scattered areas of tuberculosis in upper lobes of both lungs.	None performed.
+	?	O	+	Clear	Not found	Tuberculous consolidation of both upper lobes.	None performed.
+	?	O	+	Clear	Not found	Pulmonary tuberculosis.	None performed.
+	?	+	+	Clear	Present	Pulmonary tuberculosis.	None performed.
+	?	+	+	Clear	Not found	Evidence of moderate infiltration at right root with a few scattered miliary tubercles throughout entire r'gt lung.	None performed.
+	O	O	+	Clear	Present	Tuberculous infiltration both upper lobes.	None performed.
?	?	?	?	Clear	?	Consolidation of r'gt apex. Scattered miliary deposits in both upper lobes.	None performed.
+	?	?	?	Clear	?	Tuberculosis of both lungs, especially of the lower lobes.	None performed.
+	?	+	?	Clear	?	No tuberculosis.	None performed.
+	+	O	+	Clear	Not found	Marked tuberculosis of right upper lobe, with scattered disseminated nodules throughout both lungs.	Tuberculous meningitis; *Left Lung*—Presents on palpation a number of shotty, firm nodules, more numerous in the upper part, especially about the apex. On section shows mottled pink with purplish-grey masses 2-9 mm. in diameter. *Right Lung*—Middle and upper lobes lightly bound by adhesions. In lower part of middle lobe is a caseous nodule one cm. in diameter. Rest of lung resembles left. Bronchial nodes enlarged, 3½ cm. in diameter, caseous.

the cases, it seemed that a routine radiographic examination of the chest—in hospital work, at least—might prove to be of real value in diagnosis, especially in those cases in which the absence of a skin reaction and the inability to demonstrate the tubercle bacillus in the spinal fluid, left the diagnosis open to question. I had hoped, by a study of the clinical histories of the cases of which the autopsy records cited above were a part, to ascertain what percentage of the cases fell into this group; but the cases were not sufficiently well worked up to show this. Besides, the percentage of autopsies was so small that a search through 265 cases of tuberculous meningitis over a period of eight years yielded only 26 autopsies, 23 (or 88 per cent., as cited) of which showed considerable pulmonary tuberculosis. However, the von Pirquet and the spinal fluid were both negative in the same child in 5, or 33 per cent. of the 15 cases which form the basis of this report.

Turning now to the radiographic findings of the chest, the reports were:—

No tuberculosis—1 case.

Tuberculous glands and some involvement of the right lower lobe—2 cases.

More or less extensive involvement of one or both lungs—12 cases, or 80 per cent., a figure approaching rather closely to the necropsy findings cited above. In 4 of these 12 cases the von Pirquet and the spinal fluid were negative.

To check these up there were 5 postmortem records, 2 of which were of the cases showing slight pulmonary and bronchial gland involvement. The other 3 were of cases in which radiographic reports of more or less extensive pulmonary involvement were rendered.

GROUP I. Slight lesion shown by X-ray. Two cases.

CASE 1. *Aet* two years.

Radiographic Report.—Area of infiltration of right root involving also right lower lobe. Also one or two shadows suggesting enlarged glands.

Postmortem.—Slight congestion at bases. Lungs crepitant throughout. Bronchi contain a slight amount of mucopurulent material. No tuberculosis. Glands not enlarged and not tuberculous.

In this case the lower cervical glands were enlarged and caseous.

CASE 2. *Aet* six years.

Radiographic Report.—Pulmonary lymph nodes enlarged. From the very distinct markings probably a tuberculous bronchopneumonia in the right lower lobe.

Postmortem.—Lungs and lymph nodes negative, show no tuberculosis.

GROUP II. Radiographic examination shows marked lesions. Three cases.

These cases, in which the above radiographic diagnosis was made, all showed extensive pulmonary involvement postmortem. The cases in detail are as follows:—

CASE 3. *Aet* six months.

Radiographic Report.—Scattered areas of tuberculosis, both lungs; consolidation of right apex with probable cavity formation.

Postmortem.—Right lung shows beneath the pleura and on the cut surface scattered miliary tubercles. In the upper lobe are one or two areas ½ to 2 cm. in diameter of consolidation. No cavity formation. Left upper lobe several consolidated areas. Apex adherent, shows a cavity 3 cm. in diameter.

CASE 4. *Aet* nine months.

Radiographic Report.—Marked infiltration consisting of discrete areas distributed over both lungs. There are areas of consolidation in the right middle and upper lobes.

Postmortem.—Scattered tuberculous bronchopneumonia.

CASE 5. *Aet* five years.

Radiographic Report.—Partial consolidation of lower part of right upper and middle lobes.

Postmortem.—There are a few adhesions over the right middle and upper lobes, with numerous conglomerate tubercles beneath the pleura. The left lung shows no macroscopic tuberculosis. In the left lower lobe there is an area 3 cm. in diameter, brighter red and more resistant to touch. In addition, there are very dense adhesions over the left base (diaphragmatic surface). The tracheal glands are involved, especially the one posterior to the right sternoclavicular articulation, which is enlarged and caseous. The bronchial glands are not involved.

CASE 15. *Aet* nine months.

Radiographic Report.—Marked tuberculosis of right upper, with scattered disseminated nodules throughout both lungs.

Postmortem.—In the right lung, the upper and middle lobes are lightly bound by adhesions. In the lower part of the middle lobe is a caseous nodule 1 cm. in diameter. The rest of the lung presents on palpation a number of shotty firm nodules, which are more numerous in the upper part, especially about the apex. On section the lung is mottled pink with purplish-gray masses 2 to 9 cm. in diameter. The left lung presents a similar appearance. The bronchial glands are markedly enlarged, 3½ cm. in diameter and caseous.

One would hardly be permitted to draw conclusions from so few cases. A study of them suggests, however, that the interpretation of the radiographic shadows in the chest in children and infants, when there is considerable tuberculous involvement of the lungs, can be relied upon, at any rate, to diagnose the nature of the pathologic process. Consequently, as there is usually considerable pulmonary involvement in tuberculous meningitis, this measure may be a distinct aid in the diagnosis of this disease; particularly in those cases in which the diagnosis is not absolutely certain, owing to the failure to find the tubercle bacilli in the spinal fluid, and in which the strongly corroborative evidence of a positive von Pirquet reaction is lacking.

It would also seem likely, from a study of Cases 1 and 2, that in children in whom, on clinical grounds, there is uncertainty regarding the presence of an early tuberculous involvement in the chest, the X-ray cannot be considered a deciding factor in the diagnosis; nor can it be relied upon even in more advanced cases to furnish accurate evidence of the exact pathologic lesion present.

However, I must again recall to you that these conclusions are merely suggestive, that this paper is only a preliminary report, and that the conclusions must of necessity be of comparatively little value until supported by much more extensive observation.

Finally, I wish to express my appreciation of the interest and energy displayed by Dr. Lindeman, resident pediatrician, and Dr. Schroeder, of the house staff, in working up these cases. A comparison of their autopsy record of 38 per cent. with that of 10 per cent., for the last eight years is the best proof of the intensity of their efforts.

TUBERCULIN SKIN REACTIONS IN INFANCY.*

BY ALAN BROWN, M.D.,
Resident Physician, the Babies' Hospital.

Local reactions have been described as long ago as 1900 by Epstein, Escherich and Schick; but in these early writings no definite distinction was made between subcutaneous and puncture reactions. Until its introduction in 1907 by von Pirquet the tuberculin cutaneous test was little used and its importance was not recognized for diagnostic purposes. It would be unnecessary for me to discuss the various methods of using tuberculin for diagnosis; suffice it to say that the cutaneous test by the general consensus of opinion is more free from risks and more reliable than any of the others.

The evidence gathered from comparing the results of tuberculin tests, postmortem records and clinical examinations, taken together with experimental proof, shows that the test is specific. Von Ruck, Mantoux, Lord, Lawrason Brown, and many others, have brought forward experimental evidence on this point. Many of the criticisms of the test have been founded on faulty observations, imperfect technique and misinterpretations of results. One cannot summarize better than by quoting von Ruck, who says: "The specific nature and value of tuberculin as a diagnostic agent do not appear to be refuted by the objections which have been raised against it. The minimal amounts in which it is active, the negative results obtained by methods of application to the newborn, the increasing comparative frequency of positive reactions with advancing age in their approximate harmony with autopsy findings in the non-tuberculous, as well as the tuberculous, all testify to its reliability."

Technique.—In order to obtain uniform results it is essential that one method alone should be used, and that the simplest; the special needles or scarifiers as often used produce too much trauma, which leads one to faulty conclusions. At the Babies'

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* From the Service of L. Emmett Holt at the Babies' Hospital. Presented at the meeting of the New York Academy of Medicine, Pediatric Section, April, 1913.

Hospital numerous occasions have arisen in which the test had been regarded as positive because of inflammatory reaction following trauma, while after admission the test was negative. Large scarifications are therefore unnecessary and very objectionable.

Until three years ago 25 per cent. tuberculin was used, and since then pure tuberculin has been employed and in no instance has any bad result been seen. The best site for inoculation is the outer side of the forearm. A small drop is placed upon the skin, which has been previously washed with alcohol and after making the control scratch with a sterile needle fully two inches from the tuberculin, a similar scratch is made through the drop, each scratch being less than a quarter of an inch in length. It is usually best to hold the infant's arm until the drop is dry. If excessive reaction occurs it is well to cover the arm with gauze in order to prevent infection.

The reaction consists in a red areola and slight induration and occurs in several forms.

(1) The ordinary reaction, which usually appears within twelve to eighteen hours, and reaches its maximum intensity in twenty-four hours, remains at its height for one or two days and then gradually disappears in three to four days, being followed by a slight local desquamation.

(2) A rapid reaction which may occur within five or six hours, disappearing in ten to twelve hours. This may readily be overlooked and is not of diagnostic importance.

(3) An intense reaction which appears about the same time as the first form, but may take two or more days to reach its maximum. Rarely vesiculation may occur.

With all of these forms there is usually in some cases very marked induration of the skin. Apparently, from careful observation, there seems to be no relation between the intensity of the reaction and the activity of the disease.

It is the practice in the wards of the Babies' Hospital to make a cutaneous test on every infant suffering from respiratory disease or in cases of obscurity where tuberculosis is suspected. The following statistics have been compiled in order to determine the reliability of the test regarding prognosis and diagnosis. The total number of tests tabulated is 650. These are grouped as follows:—

One to three months, 62 cases. Of the total in this series, 3 infants gave a positive reaction, each of whom had a definite history of contact with a tuberculous individual; all the three infants died and the diagnosis was confirmed by autopsy in every case. Of the 59 negative cases autopsies were performed in 10, in none of which was any tuberculous focus found.

Three to six months, 102 cases. Seven of these gave a positive test, 6 of the infants died and the diagnosis was confirmed either by autopsy or by the finding of bacilli in the sputum or cerebrospinal fluid. The remaining case was in a child suffering from marasmus, who was discharged unimproved. Of the 95 cases giving a negative response, 13 came to autopsy; in none was a tuberculous lesion found.

Six to twelve months, 217 cases. In 43 cases a positive reaction was obtained. Of this number 35, or 81 per cent., proved to be tuberculous either by autopsy or the finding of bacilli. Five additional cases were clinically tuberculous, but died within twenty-four hours, before the result of the test could be determined; these were likewise proved to be tuberculous. Of the remaining 3 children giving positive reactions 2 had pneumonia and were discharged cured, while the third had tuberculous adenitis. In the 174 children giving a negative response, autopsies were performed in 19. In only one instance was a tuberculous lesion discovered, and in this case there was a general miliary tuberculosis present. In this child a test had been made six months previously, but no reaction was obtained and the test had not been repeated. This is the solitary instance in the entire series of a want of correspondence between the results of the test and the autopsy findings.

Twelve to eighteen months, 156 cases. Of these, 37 cases gave a postive reaction, 20 were proved either by autopsy or by finding of bacilli to be tuberculous. Of the remaining 17 positive cases, 10 (all of which were cases of clinical tuberculosis) were discharged unimproved, 3 improved and 3 cured, *i.e.*, they showed no evidence of tuberculosis. Of the 119 cases giving a negative response to the test there were 15 autopsies performed and in none was a tuberculous focus observed.

Eighteen months to two years, 112 cases. Twenty-four cases in this group gave a positive reaction, and of these 15, or 62 per cent., were proved tuberculous by autopsy or bacilli findings. Of the remaining 9 cases 4 were moribund on admission and died within twenty-four hours. All were proved tuberculous by autopsy.

Not one of the latter cases responded to the test. Four others were cases of active tuberculosis and were discharged unimproved; 1 case was discharged cured with no evidence of tuberculosis. Out of the 88 cases giving a negative response, 4 came to autopsy, none showed evidence of tuberculosis.

In this connection it is interesting to note that in the autopsies performed there were two instances of tuberculous meningitis in which a single caseous gland was the only evidence of tuberculous infection outside the brain. In another instance, the only tuberculous lesion was one small bronchial gland. All three of these patients responded to the test and in each the reaction was well marked and characteristic.

The statement made as to the unreliability of the test in infants is not borne out by the figures here presented; furthermore, it is of interest that in only one instance, pronounced to be tuberculous, in which a positive reaction might have been obtained, did we fail to obtain it—this being in the infant in whom a single test was made six months before death, possibly before his infection. The only other cases proven to be tuberculous, in which no reaction was obtained, were in moribund infants. Turning now to the different forms of tuberculosis it is worth mention that of 100 consecutive cases of tuberculous meningitis 95 gave a positive reaction, the remaining 5 being moribund on admission to the hospital.

REMARKS.

(1) Seventy per cent. of hospital cases under two years giving a positive reaction proved fatal, and, furthermore, the lesions were, with but rare exceptions, general in distribution. This should not be taken to represent the percentage of tuberculosis in hospital admissions, but it does give the frequency of the reaction in patients admitted for tuberculosis or in whom tuberculosis was suspected.

(2) In a child in whom tuberculosis is suspected the test should be repeated if the first proves negative.

(3) The infant shows a high degree of susceptibility to tuberculosis, as is shown by the fact that of 61 infants, in whom a definite history of exposure could be obtained, 41 responded to the test, and of these, 37 died of tuberculosis.

(4) In infancy a negative cutaneous reaction, except in

moribund cases, or in children suffering from measles, is almost conclusive evidence against the existence of a tuberculous focus.

Chart I.

Age.	No. of cases.	No. C + reaction.	No. of + cases with autopsy or bacilli findings.	No. of + cases proved to be T. B. by autopsy or bacilli findings.	No. of neg. cases that came to autopsy.	No. of neg. cases that showed no T. B. at autopsy.
1- 3 months	62	3	3	3 or 100 % of + reaction	10	10
3- 6 months	102	7	6	6 or 85%	13	13
6-12 months	217	43	35	35 or 81%	19	18 Test not repeated in 1 case
12-18 months	156	37	20	20 or 54%	15	15
18 mos.-2 yrs.	112	24	15	15 or 62%	4	4
	——	——	——	——	——	——
Total. .0-2 yrs.	650	114	79	79 or 70%	61	60

Chart II.

Showing the influence of exposure, mortality of those exposed and the frequency of the cutaneous reaction in such cases.

Age.	No. of cases.	No. of cases C definite family history.	No. of cases C definite family history that reacted.	Mortality of cases C definite family history that reacted.
1- 3 months	62	4	3	3
3- 6 months	102	8	4	4
6-12 months	217	30	20	20
12-18 months	156	10	10	6
18 months-2 years	113	9	4	4
	——	——	——	——
Total.... 0-2 years	650	61	41	37 or 60% of those exposed

CISTERNA-SINUS DRAINAGE FOR HYDROCEPHALUS.*

BY IRVING S. HAYNES, PH.B., M.D.,

Professor of Applied Anatomy and Clinical Surgery, Cornell University Medical College, New York; Visiting Surgeon to the Harlem and Red Cross Hospitals; Fellow of the New York Academy of Medicine; Member of the New York Surgical Society, etc.

The patient, H. P., thirteen months old, was referred to the writer by Dr. M. C. Pease, Jr. He was admitted to the Red Cross Hospital February 7, and discharged February 21, 1913.

Family History—The parents are living and well. There is another boy, three years old, who has been slow in his development. He is scarcely able to walk, is awkward in his movements and unable to say more than single words. There is no history of hydrocephalus in the family.

Previous History.—The mother was well during this pregnancy. The boy was born at full term, labor was easy. The attending doctor remarked at the birth that the child had a large head. The baby was bottle-fed.

Present Illness.—At the age of three months the child had "spinal meningitis." He was very sick for two weeks. Had a high fever, head retracted, did not have convulsions, but had "muscular spasms" all summer long.

Examination.—The child presents a typical case of hydrocephalus. The upper extremities are flexed and the hands are clinched. The lower extremities are extended and adducted with the legs crossed. There are no voluntary movements in the extremities and passive movements are resisted.

The child seems oblivious of all surroundings. At times is restless and cries a great deal as if in pain. The eyes seem normal, but an ophthalmic examination by Dr. J. M. Mills shows partial optic nerve atrophy.

The anterior fontanel is widely open, the posterior to a less degree. The greatest circumference of the head is 21½ inches; from one external auditory meatus over the head to the other, 14½ inches; and from the nasion to the inion in the mid-line is 13¼ inches.

Operation.—This was performed at the Red Cross Hospital February 8, 1913, Dr. Boynton and the House Staff assisting, and the gas-ether-vapor anesthesia by Dr. Fletcher.

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* Patient and History presented, April 10, 1913, to the Pediatric Section of the New York Academy of Medicine.

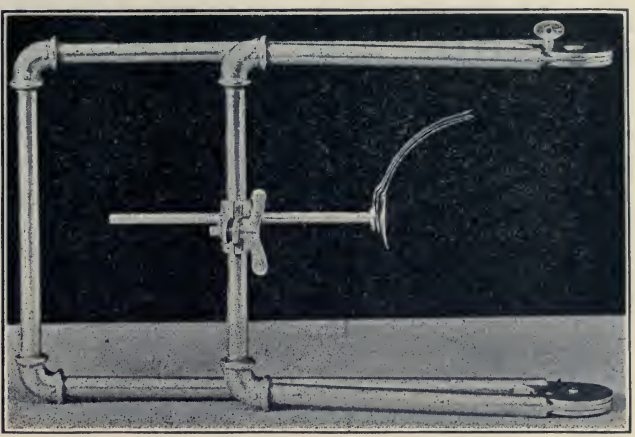

FIG. 1.—The author's portable head rest, folded for carrying.

The child's head had been shaved and prepared the previous day; it was painted with tr. iodin over the site of the operation. The child was placed, face downward, on the table, and the head firmly held in a position of flexion on the sternum by the author's head-rest. (Figures Nos. 1 and 2.)

The cisterna-sinus drainage operation with a silver cannula

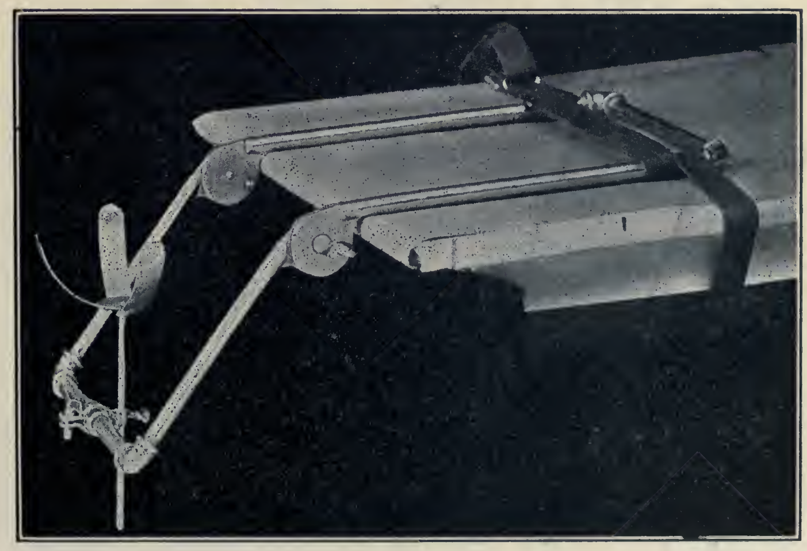

FIG. 2.—The author's portable head rest, opened and attached to an ordinary (kitchen) table by a webbing strap. The headpiece is adjustable at varying distances from the table and heights to accommodate infants or adults.

was performed according to the writer's technic as described in a paper presented to the New York Surgical Society on January 8th, and published in the *Annals of Surgery*, April, 1913. Briefly, the steps of the operation were these: An incision was made one-fourth of an inch at the left of the mid-line from a point about three-fourths of an inch above the margin of the foramen magnum to the same distance above the inion, and the skin with the periosteum reflected to expose the occipital bone. (Figure 3.)

FIGURES 3, 4, 5 AND 6 ILLUSTRATE THE AUTHOR'S TECHNIC FOR CISTERNA-SINUS DRAINAGE WITH A SILVER CANNULA.

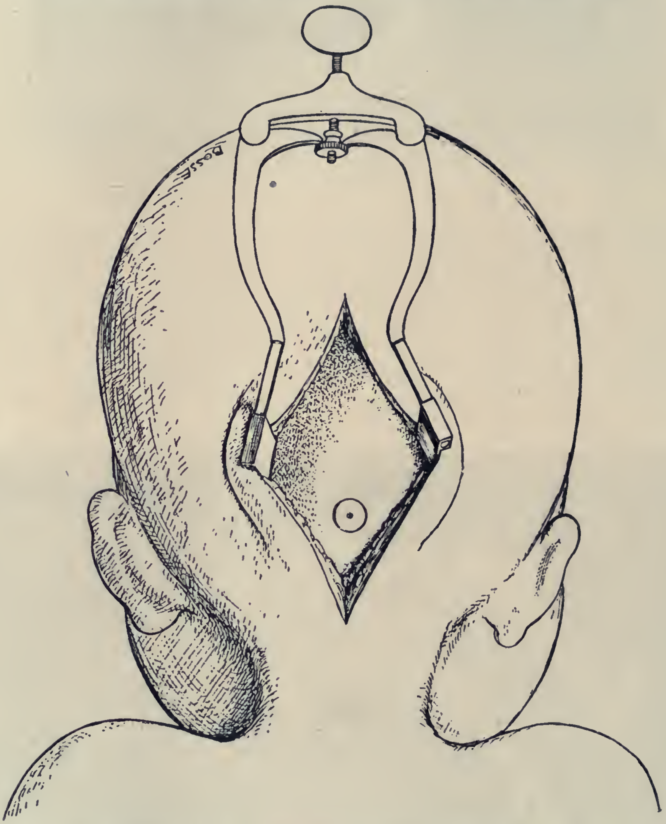

FIG. 3.—Exposure of the bone and position of the trephine opening.

A three-eighths inch button of bone was removed by a De Vilbiss trephine midway between the margin of the foramen magnum and the inion and from this a gutter half an inch wide was cut away to the last point, exposing the dura over the cisterna magna and, in the upper part of the area, the lateral (left) sinus. (Figure 4.)

A suture of vaselin-sterilized silk was passed through the dura and arachnoid so as to enclose a space about one-fourth of an inch square, within which space the short arm of the cannula was to be passed. (Figure 5.)

An incision, 1 mm., was now made into the lateral sinus. Blood flowed in a steady, small stream, rising about an inch in height. Into this small opening the long arm of the cannula (previously sterilized in vaselin) was inserted. The fit between the cannula and incision was so snug that no leakage of blood took place, but there was a flow of blood from the free end of the tube.

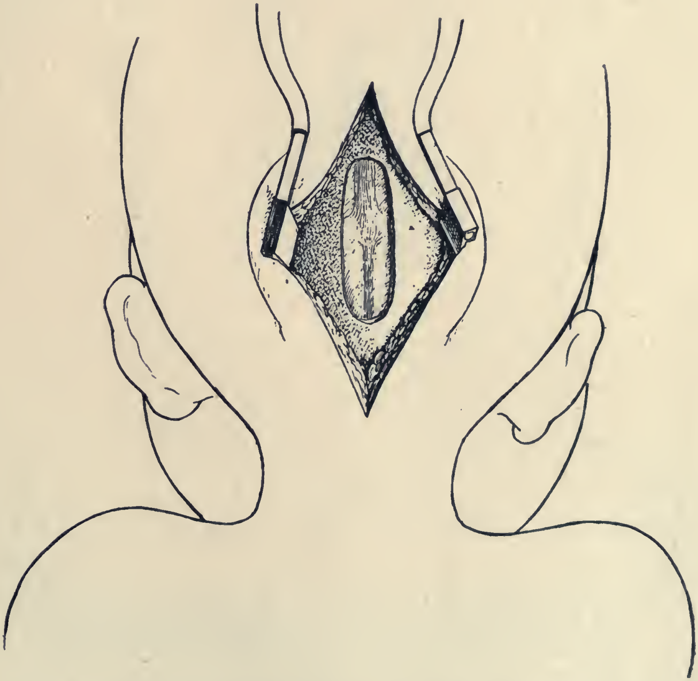

FIG. 4.—A gutter of bone has been removed to uncover the dura over the cisterna magna and the confluence of sinuses.

An incision, a little less than one inch distant from that just made in the sinus, was then made through the dura and arachnoid into the cisterna magna, in the center of the area encircled by the silk suture. The cerebrospinal fluid spurted out at once to a higher level than the blood from the sinus. After a single quick sponging, the short arm of the cannula was inserted into the incision and the wound sponged. There was no leakage of either blood or fluid. The retention suture was now tied across the tube. (Figure 6.)

This suture is designed not only to hold the tube in place and prevent leakage, but also to hold the dura and arachnoid together as a single membrane, so that the latter cannot be pushed ahead of the cannula and possibly block up its orifice. The skin sutures, which had been placed in position before starting to insert the cannula, were now tied, a firm compress applied and held in position by adhesive strapping. The entire operation had taken thirty minutes. The child at no time showed any disturbance and went off the table with a good pulse and appearance.

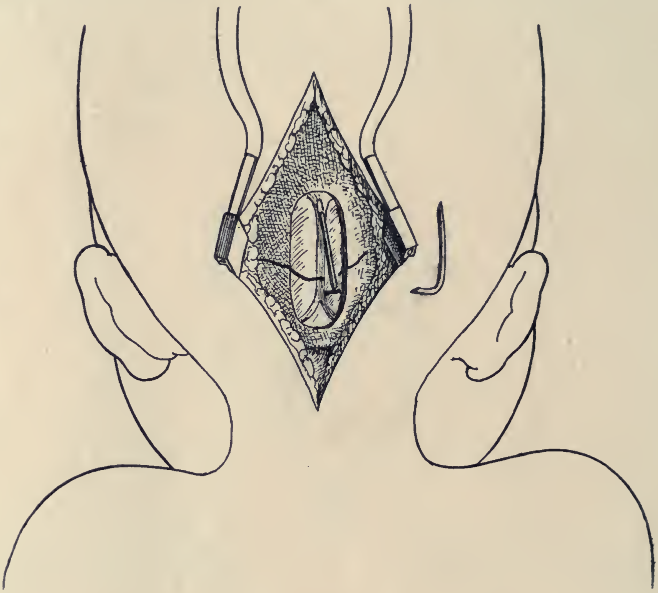

FIG. 5.—In this diagram the cannula is shown at the side of the figure and also in position in the occipital sinus. The retention suture is in place, but has not been tied. The cannula here shown measures one inch along the long arm, one-fourth inch for the short arm and 1½ mm. in internal diameter.

Post-operative Course.—As this is very instructive and interesting it will be given somewhat in detail:—

First twenty-four hours. Back from the operating room at 11:20.

12 noon. Marked twitching of the muscles of the right arm and hand and extreme rigidity of the muscles of the lower extremities.

1. P.M. Crying as if in pain. Morph. sulph, grain $^1/_{20}$.

2 P.M. Temperature, 102°F; pulse, 138.

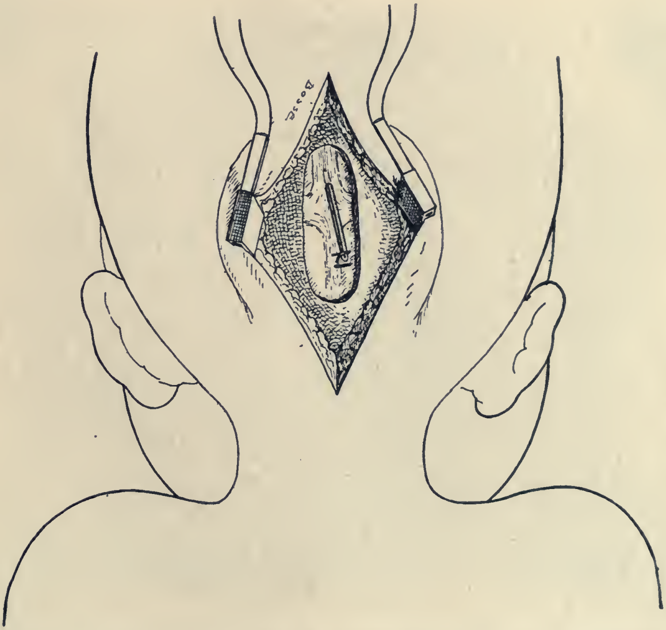

FIG. 6.—The retention suture has been tied over the cannula, which in this diagram is represented entering the longitudinal sinus.

4 P.M. Temperature, $104\frac{2}{5}$°F.; pulse, 142; respirations, 32. After a cold rectal irrigation an ice bag to the nape of the neck and an alcohol sponge the 10 P.M. temperature was 102°F., pulse 154 and the respirations 32.

At midnight the temperature was at $104\frac{2}{5}$°F., pulse 160 and respirations 28. Alcohol sponges held the temperature at this point or lower until 4 A.M., when the temperature was 105°F. At 8 A.M. the temperature was 106°F. and the pulse could not be counted; the respirations were 42. It looked as if the fight was lost. There had been no loss of cerebrospinal fluid to the surface and the anterior fontanel was much softer.

A mustard bath was given with immediate benefit; the temperature dropped 1½° in half an hour. During this time of very high fever there was "constant tightening and relaxation of all the muscles of the body, most marked in the extremities."

Rectal irrigations of water at 85° to 90° were used for half-hour periods with hour intervals between. By noon of the 9th the temperature was 104°F.; pulse, 140; respirations, 30.

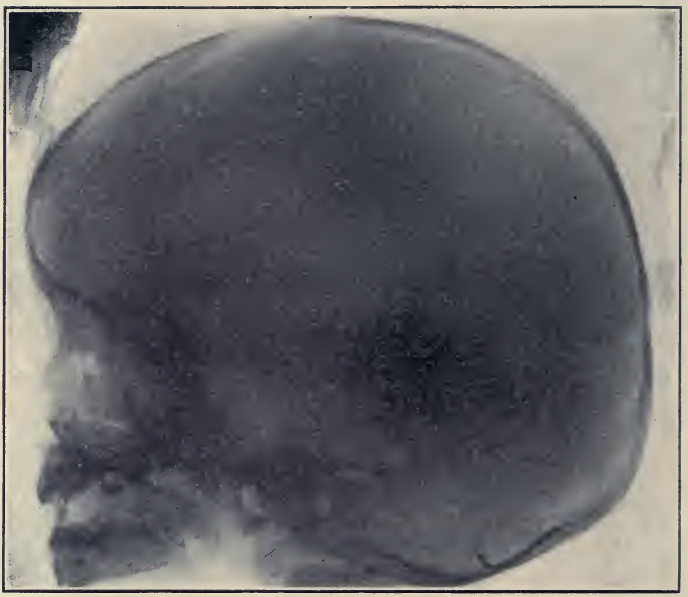

FIG. 7.—An X-ray photograph of the case here reported, with the cannula in position. This photograph was taken by Dr. Weiss twelve days after the operation.

During the afternoon one hypodermic of 1 grain of camphor in sterile oil was given; this seemed sufficient stimulation to tide over a weak and thready pulse. By 4 P.M. the temperature was 102⅗°F. The child began to take plain and barley water.

At 8 A.M. of the 10th the temperature was 100⅗°F., and the pulse 128. The dressings were changed. A little irritation was found about the catgut skin sutures, and to save any danger of complications they were removed, the stitch holes touched with tr. iodin and sterile adhesive strapping applied very firmly.

There was no escape of cerebrospinal fluid to the surface and the fontanel seemed normal in tension. With the exception of some disturbance due to improper feeding, the child's convalescence from now on was satisfactory. Measurements on the 20th were as follows: Circumference of head, 20⅛ inches, a *diminution of 1¼ inches.* From one external auditory meatus to the other, 14¼ inches, a lessening of *only ¼ inch.* From the nasion to the inion 13 *inches,* a similar diminution.

The mother took the child out for an X-ray photograph, which was made by Dr. L. D. Weiss. This photograph (Figure 7) shows the cannula in perfect position.

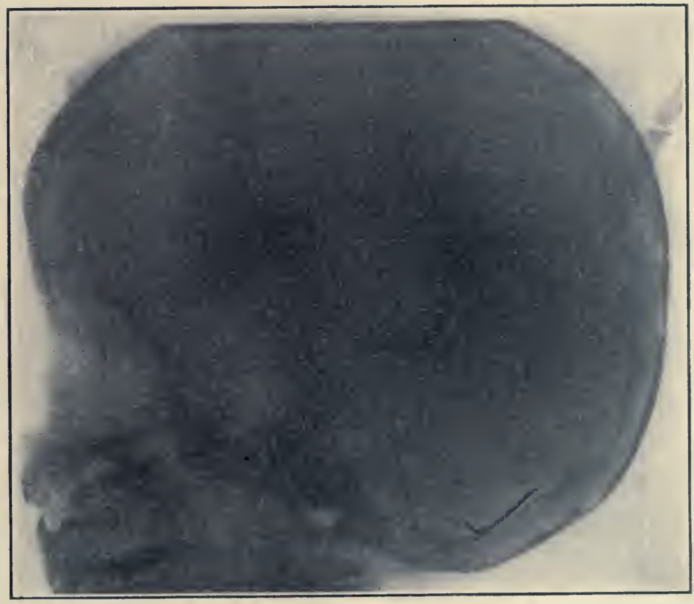

FIG. 8.—X-ray photograph by Dr. Weiss, taken fifty-six days after the operation. Note the greatly increased thickness of the skull bones as compared with the preceding photograph. While this may, in part, be due to variations in the manner in which the two photographs were taken, I do not think this cause can account for all the differences. There seems to be a real thickening of the skull bones and a new growth of bone in the region of the operation. The shape of the head has distinctly changed for the better in the last photograph.

On the 21st the mother took the child home. Before leaving it presented this condition. It seemed to hear well. It saw evidently to some extent. It could almost hold its own head up. The greatest change was in the facial expression: it began to look intelligent; as one remarked, "human." It ate well, did not cry, there was no vomiting. With slight feeding disturbances there has been a steady improvement in the child's condition up to the time of this report, April 5, 1913. It sits in its mother's lap and holds its head upright. Its legs are not crossed, and it moves them voluntarily. Its hands are not clinched and the arms are not held in rigid flexion, but they are carried in various positions. It follows objects with its eyes and is quick to notice sounds. It has gained in weight. The head measurements are: Circumference, 20¼ inches; from one external auditory meatus to the other, 13⅜ inches; and from inion to nasion, 13 inches.

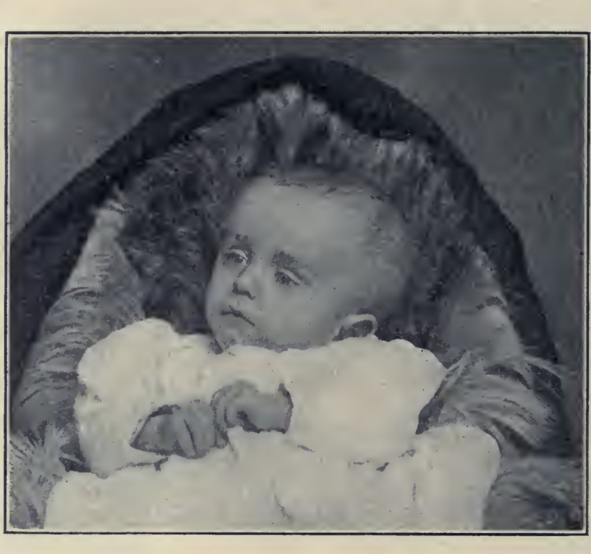

FIG. 9.—Photograph of child taken April 7, 1913.

However, there has been a steady increase in chest measurement, so there is not the marked asymmetry between the head and trunk first noted. The posterior fontanel is closed and the anterior one has greatly diminished in size and is normal in tension to touch. The mother states that the child will lie on his back, "coo" and move his arms and legs like any baby for an hour at a time.

A second X-ray was taken on April 5th by Dr. Weiss and shows the tube to be in its original position. A comparison of the two X-ray photographs will show a notable increase in the thickness of the bones of the skull and a diminution in the depth of the occipital fossa posteriorly.

Comments.—The technic which I devised, worked out on the cadaver and used in the case herein described, is so much simpler than any other method hitherto suggested, and in this case seems to promise such hopeful results that it would appear to be the method of choice in all cases where the cisterna magna is in free communication with the ventricular cavities.

In this connection I wish to suggest a modification in the skin incision. Instead of making this in the median line, a semilunar incision at one side of the median line with its concavity toward the same could be used to uncover the bone. After the operation was completed the incision would be somewhat beyond the gutter in the bone. Disturbances in the incision would be less liable to be communicated to the deeper parts. Also leakage of cerebrospinal fluid would be less likely to occur.

In regard to the excessively high temperatures following cranial operations, we are accustomed to attribute them to a "disturbance of the vital centers," due to a rapid alteration of the intracranial pressures. But escape of cerebrospinal fluid and a consequent rapid change of intracranial pressure is not always responsible for a high temperature, as the following experience will demonstrate. Recently, upon a microcephalic child I did a subtemporal decompression, removing the bone from an oval area of two by three inches *without opening the dura.* Within twenty-four hours the temperature rose to 106°F. and the case terminated fatally. Here was a simple and speedy operation. There was no loss of blood and no hammering to cause shock, yet the temperature behaved as in the cases where excessive loss of fluid has caused death.

We are very much at sea in this field and can only hope for more light by further experimental and clinical data.

CHANGES IN THE MINERAL CONSTITUENTS OF THE BODY IN RICKETS.—Curt Meyer (*Jahrb. f. Kinderhk.,* January, 1913) says the symptoms of rickets may begin as early as the fourth month. In breast-fed children who acquire rickets the disease occurs later than in the bottle-fed infant. Five infants served as material for research for the author. He finds a marked lack of balance in lime and phosphorus, while alkalies, chlorides and magnesia were well retained. With almost normal retention of nitrogen the deficiency of phosphorus was great.

TRACHEAL OBSTRUCTION DUE TO THYMUS GLAND.*

BY HENRY LOWNDES LYNAH, M.D.,

New York.

Joseph F. Three and one-half years of age, ill three days, was admitted to the Willard Parker Hospital on August 16, 1912, having been intubated for laryngeal diphtheria by one of the ambulance surgeons prior to admission with a three-year rubber O'Dwyer tube.

Physical Examination on Admission.—Child fairly well developed and nourished, lateral depression of the lower part of the chest and prominent sternum.

The pharynx was congested, and there was a moderate amount of exudate on the tonsils and uvula. Cultures from the same showed the presence of diphtheria bacilli. The *heart* was not out of position, action accelerated, muscular tone good. On palpation over the *lungs* there was a peculiar tactile fremitus over the anterior aspect of the chest. There was an area of dullness in the interscapular region posteriorly extending downward for about two inches. There were scattered moist râles, mucous clicks and many transmitted sounds throughout the chest, as is usually the rule in all intubated patients. The *abdomen* was prominent, the *liver* and *spleen* not palpable. Temperature, 101°F.; pulse, 150; respirations, 32.

A dose of 10,000 units of antitoxin was administered. On August 19th the temperature rose to 103°F.; pulse, 160; respirations, 60. There was an area of consolidation over the right lower lobe posteriorly, though the very harsh rhonchi were still audible anteriorly. On the 22d of August the intubation tube was removed, but it was necessary to reintubate in thirty minutes owing to spasm of the adductors. On the 24th the tube was coughed up and reintubation was necessary a few minutes later. On the 29th the general condition of the patient had slightly improved, the temperature had fallen to 101°F., though the pulse and respirations were still rapid, the area of consolidation had remained unchanged. On this day the tube was again autoextubated, and it was not necessary to reintubate for twelve hours; there were marked spells of spasmodic dyspnea and great restlessness, while the child remained without the tube. The patient fell asleep shortly after reintubation.

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* Presented at a meeting of the New York Academy of Medicine, Section on Pediatrics, May 13, 1913.

September 10, 1912. The general condition of the child was improving, although the physical signs in the chest remained unchanged. There was slight evening rise in temperature from 100° to 101° F. A von Pirquet reaction at this date was negative. The intubation tube was removed and the patient was able to breathe quite naturally and remained without the tube.

September 15, 1912. Five days after the last extubation the patient was doing well and breathing easily; there was but slight stridor. The lungs showed areas of bronchial breathing over both lower lobes posteriorly with many rude rhonchi over the antero-lateral aspect of the right lung. Dullness shaded off almost to flatness over this area and an exploratory puncture with an aspirating needle was made but no fluid obtained.

On September 21, 1912, the temperature, pulse and respirations had fallen to normal, and the patient was discharged under protest, after negative cultures had been obtained, the parents assuming all responsibility for the further care of the child.

On November 2, 1912, the patient was readmitted to the hospital, at which time he was suffering with a violent spasm; he was reintubated and received a second injection of antitoxin. There was no anaphylactic shock. The reintubation, as in the other instances, immediately improved the respiratory condition, the tube remained in for one week and he was again discharged from the hospital at the end of three weeks.

In the early part of January the mother took the child to the hospital for the third time and Dr. Sexton, the resident physician, referred the case to me for treatment.

After obtaining a history from the mother that the child had been treated for laryngeal diphtheria at the Willard Parker Hospital, my first conclusion was that the cause of the recurrence of dyspnea was due to subglottic hypertrophic laryngitis. I endeavored to make a laryngeal examination in the office, which was unsuccessful; next I wound a long intralaryngeal applicator with cotton, and after soaking it in some glycerin attempted to pass this in order to measure the depth of the stricture. The applicator passed through the larynx, but met with an obstruction in the trachea; the child became cyanotic and I removed the applicator, after which a quantity of thick, ropy, foul-smelling muco-pus was coughed out, which gave some relief. I had smears and cultures made of this expectoration; there were no tubercle bacilli found, but staphylococci were in abundance. I next made a thorough physical examination of the chest and met with similar signs as were recorded while the child was an inmate of the hospital. There was an area of pure bronchial breathing over the right lower lobe, numerous mucous clicks and transmitted râles. I did not doubt the existence of a chronic process and thought that there was probably a bronchiectatic cavity at this site. The left lung showed emphysematous areas and the percussion note posteriorly was of extremely high pitch. The area of cardiac dullness was somewhat increased and the apex beat just below the nipple. The child was wheezing like an old asthmatic. On further questioning the mother I found that the child had been asthmatic since birth; he had never had convulsions, but at times became very cyanotic and would break out with "cold, clammy sweats." I now suspected "thymic asthma," and once more percussed the chest. There was an area of dullness over the upper end of the sternum, the upper limit at the first intercostal space extending downward to about the fourth intercostal space; the lateral diameter from 3 cm. to the right of the median line and 2 cm. to the left. I was now convinced that I had a case of enlarged thymus gland with pressure symptoms to deal with, and this diagnosis was confirmed by the X-ray plates of Dr. Le Wald at the Gibbs Laboratory.

The mother, after having been convinced of the real cause of the trouble of her child, will not allow any surgical interference with an endeavor to effect a cure, nor will she even allow me to reintubate the child with a special tracheal type of tube. She seriously objects to all surgical interference, and seems to think that there should be a way to give him relief by medical means. So far all that I have done for the child is to give urotropin internally, which seemed at first to improve the mixed infection in the bronchi, and later mixed staphylococcus vaccine has been administered. Should the mother at any time give her permission to an operation I propose to do the Veau operation for resection of the thymus. So far in the literature there have been 50 cases recorded with a mortality of 33⅓ per cent., and many of these died several days after operation.

The interesting points of this case are (1) that the dyspnea was relieved by intubation, but returned shortly after the removal of the tube; (2) that the patient, being of a type associated with status lymphaticus, could receive two injections of antitoxic sera without any anaphylaxis or fatal result and only have a slight erythema following the administration of the first dose; (3) the child, while asthmatic since birth, has never had convulsions; (4) whether or not the case was one of laryngeal diphtheria or was a case of tonsillar diphtheria with thymus involvement.

CAUSATION OF HIRSCHSPRUNG'S DISEASE.—Meyer (*Deutsch. Med. Woch.*, February 27, 1913) sums up an article on this subject as follows: A seemingly sound infant, aged nine months, nourished on ordinary baker's milk, suddenly developed vomiting, constipation, and general malaise. It was then fed upon flour food, but after two weeks developed flour poisoning, in the course of which spasmophilia appeared. Soon afterward there ensued, as shown by the X-ray, a persistent contraction of the sigmoid flexure. There resulted obstipation, gas distention, increased peristalsis, painful spasms in the abdomen and dilatation of the colon. This syndrome was construed as incipient Hirschsprung's disease. The treatment consisted of belladonna, tinct. opii, and Friedenthal's artificial mother's milk. The child recovered after some months.—*Medical Record.*

LUPUS CURED BY NORMAL GOAT'S SERUM.—A man of forty-six had been suffering from lupus of the nose during three years. The dorsum and external nostrils were ulcerated and rhinoscopy showed that the nostrils were almost completely blocked. Microscopic examination confirmed the diagnosis of lupus. Treatment during two and a half months by X-rays produced no effect. Lagomarsino then commenced treatment by normal goat's serum. (*La Semina Médica,* July 11, 1912.) Twice a day a piece of gauze, saturated with the serum, was applied externally and internally; the nose was irrigated with the same fluid. At the end of thirty-five days, as the photographs show, the process of cure was complete. The writer says he heard four months later from the patient that there had been no recurrence.—*The Universal Medical Record.*

A CASE OF BILATERAL EMPYEMA THORACIS TREATED BY SUCCESSIVE RIB RESECTION.*

BY ABRAHAM ZINGHER, M.D.,
New York City.

The patient, M. S., six and one-half years old, with a negative family and past history, was taken ill suddenly with an acute bilateral bronchopneumonia. The disease ran a severe course, with high temperature, marked prostration and rapid emaciation.

I saw the patient first on November 27, 1912, and at that time the general condition was poor; the temperature was running a septic course, a moderate leukocytosis was present, but no signs of fluid could be detected in either chest. Both lungs showed the presence of numerous crepitant and subcrepitant râles, with an occasional patch of dullness.

The patient was seen again, at the request of his physician, on December 13, 1912, thirty-five days after onset of the illness. Now there were some doubtful signs of fluid in the left chest, and the aspirating needle revealed the presence of pus. A part of the eighth rib was resected the same night, and tubes inserted for drainage. Some improvement followed during the next two weeks, but on January 1, 1913, suspicious signs of fluid were found over the right chest, and on January 7, 1913, the flatness was well marked, and the diagnosis verified by aspirating pus from the right side. The sinus in the left chest had become very small, and the lung was expanding freely.

On January 8, 1913, an intercostal incision was made on the right side, and tubes inserted for drainage. This was profuse at first, but soon became imperfect and scanty, and on February 1, 1913, a secondary rib resection had to be performed. After this operation the patient made an uneventful recovery. Both sinuses have healed, and he has gained in weight and strength. The patient was discharged from observation on April 1, 1913.

During all three operations a light ether anesthesia was employed; on opening the right chest the patient went into shock, but recovered quickly under active stimulation.

The bacteriologic examination of the pus from both sides showed the presence of the pneumococcus.

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* Read at a meeting of the New York Academy of Medicine, Section on Pediatrics, May 13, 1913.

The general course of these cases, as seen in the one reported here, and in the majority of those found in the literature on this subject, is that of a bilateral lobar- or bronchopneumonia, complicated by a one-sided empyema. After operation the expected rapid improvement does not take place, and the septic temperature, with the developing signs of fluid in the opposite chest, point to the presence of pus in the other pleura. In such cases the interval operation is always performed. Where, however, pus is detected on both sides simultaneously, the question of opening the two sides of the chest at one operation comes up for consideration. The danger, of course, is that of a double pneumothorax.

According to Dr. Hallin, who in 1905 collected 114 cases from the literature, this danger is exaggerated. He states that, through force of circumstances, the interval between opening the two sides of the chest has become shorter and shorter, and enumerates several cases where both sides were operated upon simultaneously with good results.

If one decides to wait, most authorities agree that it is better to operate the left side first, so as to relieve the pressure upon the heart, and also to avoid the danger of a complicating pericarditis. The pus from the right side can be aspirated and after several days the chest is opened.

Shock occurs occasionally, either at the first or, more often, at the time of the second, operation; it should be treated by active stimulation.

Treatment of Mucous Colitis in Children.—T. R. C. Whipham states that in the management of this condition it is necessary to exclude sugars from the diet and to administer alkalies to dissolve the mucus. The following may be given regularly before meals:—

℞ Potass. bicarb. Potass. citrat.	āā grs. v
Tinct. nux vom.	♏ ii
Inf. gentiane co. (B. P.)	ad ʒii

A rhubarb and soda powder, together with 2 grains of gray powder, should be given every night or every other night.—*Medical Diseases of Children.*

SOCIETY REPORTS.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Thursday, April 10, 1913.

HENRY D. CHAPIN, M.D., CHAIRMAN.

DR. IRVING S. HAYNES reported the case of a child thirteen months old upon whom he had operated for hydrocephalus on February 8th, by drainage of the cisterna magna into the lateral sinus by means of a silver cannula. The case was a typical one of the disease, large head, open fontanels, spastic extremities, continuous whine and cry.

Cisterna sinus drainage was performed after a technique described in a paper presented to the Surgical Society in January and published in this month's *Annals of Surgery*. The operation consisted in exposing the dura over the confluence of sinuses downward toward the foramen magnum and over the cisterna magna. A communication between the cisterna magna and the lateral sinus was established by means of an angular silver tube having an internal diameter of 1½ mm. After the cannula was in place it was held there by a retention suture, previously placed and the skin tightly sutured.

Marked changes followed. At the end of twenty-four hours the temperature was 106°F., the pulse not countable and the respirations 42. After a mustard bath and intermittent colonic irrigations of cold water the temperature was 100⅖°F. at the end of the next day. Convalescence was uninterrupted thereafter. On April 5th the measurements showed a diminution in the head of 1¼ inches in the circumference, ¼ inch in the saggital line from the nasion to the inion and 1⅛ inches over the head from one external auditory meatus to the other. The general improvement has been very noticeable. (For article in full see p. 670.)

DR. PEASE.—I saw this case when it first came to us. We sent it to Dr. Haynes on the possibility of his being able to do something for it. There was no question that the child had hydrocephalus, there was tension in the anterior fontanel, etc. We advised the mother to go to Dr. Haynes for treatment. The case has improved most remarkably. There is now very little tension in the anterior fontanel. The child's nutrition has been kept up and all has been accomplished that we can expect. Personally, I look upon this case as a very remarkable one and one in which I did not expect to see such a good result. Two years ago I was of the opinion that surgery should help us in these hydrocephalic cases, and it has helped us.

DR. CHARLES HERRMAN.—I saw this case in the Vanderbilt Clinic before it went to the Post-Graduate. The improvement is not very great, except in the size of the head. The child has had hydrocephalus for many months and the process of compression has also lasted many months and we must not therefore expect too much from a surgical procedure. Does it do any real good? The damage done to the brain is irrevocable. The child is still spastic and the fundal changes are still present. The size of the head is diminished, but whether this will be permanent we cannot tell. This was not a favorable case for marked improvement in nervous symptoms.

DR. HAYNES, closing the discussion, said that all recognized the fact that this was experimental. Surgery alone offered a chance for patients afflicted with hydrocephalus, but it had failed in the past. Perhaps in the case presented the patient would have recovered without surgical interference, but there were no reasons for such expectation. All that he claimed for this work was: First, a distinct diminution in the size of the head; second, a marked diminution in the intracranial pressure; third, the child's entire attitude had changed; fourth, his spasticity was less. It was interesting to note that when he was constipated his spasticity increased. Hearing seemed to be normal, for the child turned his head when spoken to. The child's intelligence or mentality had apparently been bettered; he remained comparatively quiet and did not whine and cry as before. With regard to lumbar puncture, the results in these cases were negative, except in the 9 cases reported by Bókay.

SIMPLE SYRINGE TRANSFUSION WITH SPECIAL CANNULAS.

DR. EDWARD LINDEMAN presented this apparatus, which consisted of two sets of cannulas, two tourniquets, and twelve syringes. Two sets of cannulas were employed—one for the donor, the other for the recipient. There were three cannulas to each set, and each telescoped within the other. The innermost cannula was practically a hollow needle, with one end ground to a fine point and short bevel. The hollow needle was fitted snugly into cannula No. 2, which was shorter than the needle and fitted snugly into cannula No. 3, which was shorter than cannula No. 2. The proximal ends of No. 1 and No. 2 were capped with stationary thumb-screw caps. The proximal end of No. 3 was capped with a receiver to fit any Record syringe. The caliber of No. 3 was the same as the tip of a Record syringe. In very small infants with very small veins only No. 1 and No. 2 were employed, No. 2 being capped with a receiver to fit the syringe. The syringes used were Record syringes, with a capacity of 20 c.c. and could be sterilized by boiling.

Operation.—One operator managed the syringe of the recipient; another operator managed the syringe of the donor. The donor and recipient were placed in the recumbent posture and suitable veins were selected. In infants the external jugular or one of its tributaries was entered most advantageously. The tourniquet was placed in position, and the skin was sterilized with iodin. The cannula was then held in a position almost parallel to the vein and the cannula was forced in until the first joint had entered the vein, when the innermost cannula was withdrawn within the second. When the second joint had entered the vein, No. 2 was withdrawn about ½ inch. Cannula No. 3 was then gently pushed into the vein to a desirable length, usually ¾ to 1 inch sufficing. Cannulas No. 1 and No. 2 were now withdrawn entirely. If the vein had been successfully entered blood would flow through the cannula. A syringe containing warm saline solution was immediately attached and the escape of blood was thus prevented. A cannula was inserted in the vein of the donor, and a syringe containing warm saline solution attached and loss of blood prevented. An empty syringe was substituted for the one containing saline solution and blood was withdrawn from the donor as rapidly as possible. When the syringe was full, the assistant passed it to the operator on the recipient, who removed his saline syringe, attached the syringe containing blood, and evacuated the contents gently but speedily into the vein. It had been found advisable for a third man to remove the syringe from the cannula of donor as soon as filled. The operator could thus hold the cannula in place with one hand, while with the other hand he might at once adjust an empty syringe into the cannula. Loss of blood was thus reduced to a minimum.

Conclusions.—(1) Bright polished surfaces of syringe and cannulas were requisite.

(2) A syringe used once should not again be employed until thoroughly cleaned with sterile water.

(3) Air must be avoided.

(4) Tourniquet of patient must be removed after vein was entered with cannula.

(5) Tourniquet remained on donor throughout the operation; momentary release of tourniquet might be advisable once or twice during the course.

(6) Dexterity and speed were requisites for success.

(7) Syringes could be evacuated more rapidly than they could be filled without any harmful effects. This difference in time allowed for attachment of syringe with warm saline solution every now and then, thus preventing clotting.

The time elapsing in filling and evacuating the syringe was so brief that blood did not undergo any alteration from donor to donee. No lubricant had been employed except in one case. It seemed to make little difference. However, there was no objection to a film of albolene coating the syringe. The same vein could be used repeatedly for transfusions, since no thrombosis nor permanent injury to the vessel occurred. Any quantity of blood could be transfused and the quantity was definitely measured at the time of transfusion.

RADIOGRAPHIC STUDIES OF THE CHEST IN TUBERCULOUS MENINGITIS.

Dr. L. O. Woodruff read this report, which was based on 15 cases of tuberculous meningitis from the children's medical wards of Bellevue Hospital. (See p. 659.)

Dr. I. S. Hirsch showed a series of very interesting radiographs regarding the findings in lungs of children suffering from tuberculous meningitis. The shadows in the lungs were not always due to tuberculous areas. In some cases they proved to be atalectatic areas, or bronchi and blood vessels caught in the oblique position.

TUBERCULIN SKIN REACTIONS IN INFANCY.

DR. ALAN BROWN made this report from the service of L. Emmett Holt at the Babies' Hospital. (See p. 665.)

DR. HEIMAN: In making a von Pirquet test the best method to use is a needle with which to abrade the arm. The least danger is from a borer suggested by Dr. von Pirquet himself. In scratching the arm it is possible that we open some of the blood vessels and thus permit the tuberculin to be absorbed. The tuberculin is to rest upon the abraded surface and thus produce a local reaction without going into the circulation. The von Pirquet is the least dangerous method, and therefore it has survived. As regards the dilution of the tuberculin, by attempting it the tuberculin is decomposed and for this reason it is best to give it in the 100 per cent. strength. It is a well-known fact that the reactions obtained do not correspond to the degree of the process in the individual. I have seen a very strong reaction with marked infiltration, which points to acute tuberculosis. A small areola around the von Pirquet vaccination probably points to a latent negative tuberculosis.

DR. L. EMMETT HOLT: I have seen very marked tuberculin reactions with very little tuberculosis, and a slight reaction where the process was very active. There is no way in which we can determine the amount of tuberculosis by the amount of reaction obtained.

DR. ALFRED S. HESS: My experience has been the same as Dr. Holt's. I have gone over hundreds of reactions in children trying to get some association between the amount of reaction and the degree of tuberculosis, but without avail.

THE PROGNOSIS OF TUBERCULOSIS IN INFANCY. REPORT OF A WARD INFECTION.

DR. ALFRED F. HESS read this paper.

The present status as regards the prognosis of tuberculosis in infants under two years of age is that it is almost always fatal. This has been brought out by French and German writers. I shall report a number of cases which give tuberculin skin reaction and have been followed a number of years. The first group consists of 7 infants followed for two years. They were surrounded by tuberculosis in their homes, but clinically were well. The second group consists of 300 infants under five years of age, many under one year, many under two years, and the rest up to five years. In all these infants the von Pirquet had been done twice and repeated every year. Group three consists of infants that drank milk contaminated with tubercle bacilli. I reported these cases two and three years ago, respectively. Group four consists of a small group of infants that went to the Preventorium and were surrounded by tuberculous adults.

Group I. Surrounded by tuberculous father or mother; 2 under six months, 2 between six and twelve months, 3 from one to two years. They have been followed for three to four years. All gave positive von Pirquet twice. The tuberculous individual was later removed or died. Of these 7 cases 1 has died of tuberculosis and the others are negative clinically. These cases cannot be exactly compared to those mentioned by Dr. Brown. His cases were sick infants who came to the hospital. These were absolutely normal.

Group II. 300 children—1 under six months, 4 between one and two years, 3 between two and three years.

All are well. All three gave positive von Pirquet reactions. A case of four months was especially interesting. Admitted to asylum when four months of age. Mother died of tuberculosis two months after the child was admitted to the hospital. The child had been nursed two months. Three other children in the family had tuberculosis. Last April the child developed pneumonia and pleurisy with effusion. Some of the fluid was injected into a guinea pig and the result was negative. The child is now well. The child has some features associated with tuberculosis, as long lashes, fair skin, etc. All of these 8 children are doing well. They are now from four to six years.

In the past two years there have been four deaths in the institution from tuberculosis. One case developed acute tubercular meningitis. The child had been perfectly well. It developed a tonsillitis, and ten days later tubercle bacilli were found in the spinal fluid. It died in seventeen days. One other child of nine months developed tuberculosis after measles, and 2 other cases succumbed. Tuberculosis, therefore, does not play a large rôle among these 300 children.

We must consider the relation of measles and tuberculosis in young children. In the last two years 145 cases of measles developed. One or two of these afterward developed tuberculosis. This includes children up to five years of age. One-fourth of all the children in the institution gave a positive von Pirquet. One-third of all children after the first year gave positive von Pirquet in this institution. It is therefore interesting to note that out of 145 cases of measles only 1 or 2 developed tuberculosis.

Group III. Exposure to bovine tubercle bacilli. Three years ago I reported upon 16 out of 18 of these cases. One developed large cervical glands, in which the bovine type of tubercle bacilli was found and cultivated. It is now five years since these children drank the infected milk. Twelve have been followed. All are well. None have developed tuberculosis. The prognosis of latent tuberculosis even in very young infants is not bad. There are many infants, infected during the first year of life, who, as we have shown, show no signs of tuberculosis in later childhood.

Tubercle bacilli are not necessarily fatal to young infants. They have some resistance to these organisms even when they are less than six months of age. As the result of observing this large group of infants, all of whom were less than two years of age, and some less than six months, we must conclude that latent tuberculosis may exist in earliest infancy and that the prognosis is not always fatal. We have been able to follow these infants for from four to five years and found them in most cases well.

The prognosis of tuberculosis in infants giving clinical signs is, on the other hand, very bad.

Ward Infection.—A nurse was in charge of 10 infants varying in age from two to three years. Three of these 10 infants showed a positive von Pirquet reaction. She was in the ward six weeks and was removed because she was not well and was found to have tubercle bacilli in the sputum. Soon after she left, the children were tested again with tuberculin and there was found to be no change. When tested three months, and again six months later, all gave a positive tuberculin reaction. These children did not leave the precincts of the asylum. No other group of children developed positive reactions. The general infection was probably partly disseminated by the nurse in the course of treating the mouths of the children for stomatitis.

HELIOTHERAPY AS SEEN IN ROLLIER'S CLINIC.

Dr. I. S. Hirsch made this presentation, illustrating his remarks with an interesting series of photographs. He said that

Leysin, a village in the southwestern part of Switzerland at an elevation of 4,000 feet, had exceptional climatic conditions of intense sunlight, dry atmosphere, freedom from dust, little wind, moderate warmth in summer, and not too great cold in winter, thus permitting isolation during the winter as well as summer and making possible uninterrupted life in the open air.

Dr. Rollier, in 1903, inaugurated there the first clinic for the exclusive treatment of surgical tuberculosis by sunlight. So successful was he that three hospitals, accommodating about 300 patients, had been built.

One of the hospital buildings, containing about eighty beds for children and adults, built in accordance with the most approved ideas of hospital construction, stood on the mountain side overlooking the village of Aigle, and, like the other buildings, faced south and was protected from the winds of the north and east by the hill upon which it stood. It was almost entirely surrounded by fir and ash trees, but in such a manner that it still received the full value of the sunlight at all times of the day. Large balconies were provided on three sides of the building, so that all the beds in the interior might be wheeled out through the wide windows, which were constructed without ground sills. All the patients' rooms faced south. By means of large folding doors the wards might be completely exposed, not only to the south, but also to the east and west. On sunless days and at night the airing was continued in this way, the occasional wind or storm being shut out by means of these doors. When the sun shone, the beds in the early morning were pushed out upon the balconies, from whence the view was beautiful.

The treatment instituted by Rollier consisted first of the general exposure of the entire naked body and second of the localized exposure of the particular site of the disease to the sunlight without any intervening lenses or glass. When the days were cloudy and there was no sun, a simple exposure of light and air was carried out, but the patients were partially clothed. Individuality was the watchword of his treatment, based on the general principles stated.

When the patients had accommodated themselves to the new environment, which took from several days to three weeks, an exposure to the sun was given, beginning with the feet and gradually extending upward, until, at the end of eight days, the chest was reached. The parts were exposed a few minutes every other day, then several times a day. First feet and ankles, then ankles and knees, then thighs, and thus part by part until the entire body was pigmented. It was only when the entire body was pigmented that a general exposure was given.

It was absolutely essential for the success of the treatment that no dermatitis should occur. The eyes were protected from the direct light of the sun. The period of exposure to the sun of the entire body was gradually increased, from two to four hours once or twice a day, then to four to five hours once or twice daily. Even when the maximum exposure was given there were two hours during the day when the patient was removed from the sunlight.

Under this exposure the skin became markedly pigmented, turning to a very dark brown color. An early advent of this pigmentation was a sign prognostic of good results. Blondes did not respond, nor did they bear the sunshine as well as brunettes and they required longer treatment. The pigmentation was considered to play a very important rôle in the treatment because it was believed that it lowered the resistance of the skin to the passage of the light rays, and modified the heat rays so as to remove the possible harmful effects, for the heat of this intense sunlight might be exceedingly harmful. The exposure to the sun caused also an hypertrophy of the skin itself, increased its vitality and resistance and protected the organism against extremes of temperature; such conditions as acne or furunculosis are never seen in patients so exposed. In winter, when there is at least one meter of snow on the ground and sometimes two, the children lie about naked in the sun on the balconies and those that were well enough to walk wandered about naked in the sunlit snow, the radiations from the snow being so intense that the temperature in the sunlight was 50° to 60° C., while at the same moment it might be 0° in the shade.

After general pigmentation had been obtained the rays were applied locally to the site of the disease, whether it was the hip, knee, or spine—at first only for about five minutes per day, then two or three times a day, then ten to fifteen minutes, then, finally, for a period of two to six hours. The joint was usually immobilized by means of counterweight extension. When immobolized by a plaster jacket an opening was cut in the jacket in the front and back to permit the exposure of the affected parts to the sun.

The first local effect of the sun's rays was an analgesic one, which was produced with remarkable rapidity and quickly permitted the removal of the fixation apparatus.

In the treatment of caries of the spine, the patient received half the sunlight treatment on the back over the kyphosis and half on the abdomen for the treatment of the abscess. When suppuration with sinus formation was present, sinuses were not treated antiseptically or surgically, but exposed directly to the sunlight. Sequestra were extruded without any surgical assistance and the fungus granulations were absorbed. The wounds healed with soft pink scars. The thing that impressed one at Leysin is the excellent health of all exposed to the sunlight, and the rapidity with which, aside from the general condition, the local condition improved. The patients arrived there usually emaciated, anemic, racked with fever, with numerous joints involved, and the condition frequently complicated by discharging sinuses, the cases of all being of the worst kind, those which have been practically given up as hopeless after every other method of treatment had been tried. Yet, after several months' sojourn in this climate under this routine, they took on weight, the muscular atrophy disappeared, the skin became smooth and glossy, the temperature fell, and the blood condition improved. The demonstration of Dr. Rollier's results, as controlled by photograph and radiograph, was convincing even to the most skeptical. All forms of peripheral tuberculosis were thus treated; also peritonitis, cystitis, adenitis and all forms of intestinal tuberculosis.

Rollier applied this method to the treatment of patients with tuberculosis of the sternum and the ribs, which was practically inoperable from a surgical standpoint, but which might be cured after a year's treatment by this means.

The most wonderful result of all, perhaps, was the reformation of the joint after almost complete destruction and ankylosis. This effect upon the joint was apparent early in the treatment. The limb itself, distorted and swollen, returned to its normal form. In many of these cases the radiograph upon admission showed that the entire form of the bone was completely gone, with only a vestige of the periosteum remaining, yet one year later the bone was entirely reformed and in an almost normal condition, with the joint outline distinct. The scars upon the joints in many of the cases were the tell-tale marks which indicate the condition before treatment.

Rollier's results spoke for themselves. About 90 per cent. of the cases were cured. In one and one-half years, out of 60 cases of tuberculous joints, 54 were healed, 5 improved, and 1 died. Of 60 cases of tuberculosis of the bones, 54 were healed, 5 improved, and one died. Of 45 cases of tuberculous peritonitis, 32 were healed, 5 improved, 1 remained stationary, while 4 died. Of 88 cases of tuberculous lymph nodes, 81 were cured, 6 improved, and 1 died.

The effects were undoubtedly due to the proper application of the sun's rays and all other factors were but adjuvants to the treatment. Under the general effects of the exposure might be considered the vasomotor excitant effect on the skin reacting on the internal circulation, resulting in an increased metabolism. The pigmentation and hypertrophy affected the condition of the red blood corpuscles, raised the hemoglobin index and increased the number of the cells themselves. The local effects were the well-known bactericidal effect of the sunlight on the tubercle bacilli and pus cocci, etc., and the infra-red and ultra-violet rays, which have undoubted chemical and heat effects. It was to the ultra-violet rays that Rollier ascribed the greater part of the results achieved. Rollier insisted upon the importance of allowing nothing to interfere between the exposed surface of the skin and the sunlight. This was founded upon the physical principle that the thinnest sheet of glass would completely absorb the violet rays. On dark or stormy days the wounds were treated by either the X-rays or Cooper-Hewitt light, both containing ultra-violet rays.

TUBERCULOSIS ACQUIRED THROUGH CIRCUMCISION.

DR. L. EMMETT HOLT read this paper. He stated that tuberculosis by direct wound inoculation, while not a frequent method of contracting the disease, had yet occurred often enough to demonstrate that this was a real danger. In 1887, Willy Meyer collected a number of such instances and added the report of a case of his own in which tuberculosis was acquired through ritual circumcision. While many observations had been made on this subject since that time the report of only 2 cases had come to his notice in this country—1 by Ware, and 1 by Sara Welt-Kakels. From inquiries, however, he had been led to the opinion that many cases occurred which did not find their way into print.

The case here reported was of more than ordinary interest by reason of the virulence of the infection and the fact that death occurred at an earlier age than any case which the author had found on record.

The patient, a baby three months of age, was admitted to the Babies' Hospital on February 24, 1913, with an extensive ulceration of the penis. The child was one of seven, four of whom had died from acute diseases. The parents were healthy, as were the other living children. The infant was reported to have weighed 11 pounds at birth and had been breast-fed up to the date of admission. When eight days old ritual circumcision had been performed, the blood being sucked in the usual manner. The wound did not heal properly and at the end of a week suppuration was present and ulceration followed, which had gradually extended up to the time when the infant was brought to the hospital. About two weeks after the operation glandular swelling was noticed in the groin. These swellings had gradually increased in size, although they showed no tendency to suppuration. The digestion had been good and the nutrition well preserved until three weeks previous to admission, since which time there had been a steady loss in weight, refusal of food, slight fever and cough. There was a discharge from one ear and from the nose. Four or five days previous to admission there had been a scanty maculovesicular eruption over the trunk and extremities. At the time of admission the infant weighed 11½ pounds and did not appear acutely ill. Scattered over the body were fifteen or twenty lesions resembling those of varicella. None were seen on the hands or feet and none on the mucous membrane. These lesions were 3 to 4 mm. in diameter, vesicular at the periphery, and crusted at the center. A very narrow zone of redness surrounded them. Many râles were present over both lungs, but there were no signs of consolidation. The heart was normal, the abdomen distended, and the spleen much enlarged, reaching fully 2 inches below the costal margin. The liver was also markedly enlarged, reaching 3 inches below the costal margin. There was a chain of nodular swellings in the inguinal region on both sides. The penis showed complete destruction of the skin by ulceration quite to the abdominal wall and the base of the scrotum. At the meatus was quite a deep ulceration, producing an appearance resembling a slight hypospadias.

The tuberculin test gave a strongly positive reaction. Tubercle bacilli were found in the discharge from the penis, in the sputum, and in the scrapings from the cutaneous lesions. The bacilli from the ulcers of the penis were carefully differentiated from the smegma bacilli.

The child lived sixteen days after admission. During this period there was a constant temperature, varying between 99° and 101° F., but occasionally going to 102° or 103°F. There was progressive weakness, increasing cough, and râles throughout the chest. The glandular swellings became larger, but did not suppurate. The other external lymph nodes were not enlarged. The blood examination showed a leukocyte count of 16,000; polymorphonuclears, 85 per cent.; lymphocytes, 14 per cent.; hemoglobin, 65 per cent. Just before death the leukocytes increased to 24,000, and the polymorphonuclears to 92 per cent. No cerebral symptoms were present, but there was considerable restlessness; lumbar puncture was done two days before death. Under normal pressure a clear fluid was obtained which gave a faint globulin reaction and showed an excess of cells. The skin lesions dried up slightly during the period of observation, but no new ones appeared.

The autopsy showed three or four tubercles in the brain over the base and a few over the convexity; the ventricles were not distended and there was no evidence of meningitis present. Both lungs were everywhere studded with miliary tubercles and small tuberculous nodules. No part of the lungs had escaped. The bronchial and mediastinal lymph nodes were caseous, but not very large and none showed softening. Examination of the heart showed a small yellow tubercle upon the coronary artery, a tuberculous nodule, 2 mm. in diameter, was found in the wall of the right ventricle and a smaller one in the wall of the right auricle near the entrance of the superior vena cava. This involved the pericardium, endocardium, and cardiac muscle, and was cheesy. The parietal peritoneum was studded with miliary tubercles and tubercular nodules. The liver and spleen showed many large tubercles. The kidneys each contained small caseous tubercular nodules in moderate numbers, chiefly in the cortex. Both adrenals contained tubercular nodules and two were found in the pancreas. The stomach and duodenum were normal, but throughout the rest of the small intestine were great numbers of tubercular ulcers. The mesenteric lymph nodes were greatly enlarged and caseous. Extending upward from these was a chain of large caseous retroperitoneal lymph nodes which followed the iliac arteries. One of the iliac arteries contained a cheesy lymph node in its adventitia. The tuberculous character of this lesion was confirmed by microscopic examination. Three tubercles were seen on the mucous membrane of the bladder near its base. Both middle ears contained pus.

The man who performed the circumcision was examined. No physical signs of disease could be found in his chest, but he was a pale, thin, emaciated individual, who looked decidedly tuberculous. From his sputum two acid-fast bacilli were found which looked like tubercle bacilli. Thus the evidence of infection through the circumcision wound seemed conclusive. The lesions found at autopsy pointed strongly to a spreading of the infection through the lymphatic system beginning from the wound, and afterward a general blood infection. Dr. Holt called special attention to the lesion in the iliac artery and to the tuberculides of the skin, and said that he believed that the latter lesion was often overlooked. He had seen 2 other cases during the present season, both in young children.

The writer said he had collected reports more or less detailed of 39 other cases of tuberculous infection through circumcision. Of these 40 patients, 16 were known to have died; 7 were reported as having partially recovered or as being scrofulous; in 12 the final results were not given; only 5 were stated to have recovered. The youngest fatal case was the one just reported. The usual cause of death had been general tuberculosis. In many of the reports several children had been infected by the same operator. In nearly all of the reports the fact was stated that the families were free from tuberculosis. As a rule, the symptoms and progress of the infection were similar to the case reported. In a very considerable number of cases it was reported that the glands broke down and abscesses formed, usually in two or three months from the time of the initial infection. The cases in which early suppuration of the inguinal glands took place and which were operated upon, either by removal or curetting, were among those in which the results were the best. The symptoms of a widespread general infection rarely occurred earlier than the third or fourth month. That the infection spread through the lymphatic system seemed certain, and early removal of the inguinal glands would therefore appear to be the most important measure to be employed in checking the spread of the infection. To be successful this, of course, must be done early.

In a very large proportion of the cases the first diagnosis made was syphilis, and much valuable time was lost in antisyphilitic treatment. Dr. Holt said that it was his belief that syphilis was much less frequently acquired in this way than was tuberculosis and that the latter disease should be first suspected. With the modern means of diagnosis at their disposal the early recognition of tuberculosis ought not to be difficult. While the reports of the number of cases acquired through circumcision were considerable, there must be a very much larger number which never found their way into the literature; moreover, it was also certain that syphilis had been acquired in this way. These facts led the writer to emphasize the statement of the late Professor Maas, that "it is the duty of the physician to raise his protest against the performance of ritualistic circumcision in every case."

DR. NORTHRUP presented an X-ray of the lungs of a child. It was one of 5 cases in which the subjects were delicate, had a temperature, etc. The cases resembled pneumonia; there were scattered râles in all parts of the lungs, but no signs of consolidation. At autopsy the lungs were studded with miliary tubercles.

DR. S. WELT-KAKELS: Dr. Holt referred to the case reported by me three years ago. A boy of six months had enjoyed good health. The child had been circumcised on the ninth day. According to the mother the wound never looked well. There was slight fever and gastric disturbance. At the end of four weeks the inguinal glands began to swell. When six weeks old the gland was aspirated and a serous fluid obtained. A laboratory examination showed the tubercle bacilli. von Pirquet was positive. A few weeks later the inguinal glands were removed and partly curetted. They were tuberculous. We could not get the Mohel to come for examination, but we found out that he coughed. The case of Dr. Holt is unique, because of its rapid course. If the glands are removed at a very early period the prognosis is good. If the child has good resistance or is breastfed the process stops there, otherwise it becomes generalized.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Meeting May 13, 1913.

HENRY DWIGHT CHAPIN, M.D., CHAIRMAN.

BILATERAL EMPYEMA TREATED BY SUCCESSIVE RIB RESECTION.

DR. ABRAHAM ZINGHER made the case report, which will be found printed in full on p. 684.

NEW PACKAGE FOR GLYCERINATED VACCINE VIRUS.

DR. FRANK S. FIELDER, of the Department of Health, presented for the inspection of the members of the section some new packages in which vaccine virus is put up by the Department for use by physicians. One, selling for ten cents and having a white wrapper, contains enough vaccine for one vaccination. The other, selling for thirty-five cents, and wrapped in pink paper, contains enough for five vaccinations. The smaller package consists of a wooden tube containing a sterile needle, a capillary tube of vaccine and a rubber bulb. In use one end of the tube is broken off and pushed into the bulb, the scarification is performed with the needle, the other end of the tube is broken off, and the vaccine is squeezed out on to the scarified area and spread by means of the needle. No sterile toothpick is supplied, as in the older packages.

TRACHEAL OBSTRUCTION DUE TO THYROID GLAND.

DR. HENRY LOWNDES LYNAH made this case report, and presentation, for which see p. 680.

THE COMPLEMENT FIXATION TEST IN GONORRHEA.

DR. ARCHIBALD MCNEILL read this paper, which is printed in full on p. 657.

VULVOVAGINITIS IN YOUNG CHILDREN: ITS CONTROL AND SUCCESSFUL TREATMENT.

DR. NATHANIEL BARNETT read this paper, which is printed in full on p. 650.

DISCUSSION OF DR. McNEILL'S AND DR. BARNETT'S PAPERS:

DR. FREEMAN: This disease needs a great deal more attention than it has received. The great task in connection with this trouble is to find sufficient accommodation to take care of these children. In the tenements there is no room, nor in the hospitals. The disease spreads rapidly in institutions and hospitals and there is no place in which to place the sufferers. The best results from local treatments have been obtained by changing from one local application to another. With the endoscope it is possible to make direct applications to places that are in need of it. The results from vaccination are questionable. Some of the men in our institutions claim that they obtain good results. Others do not believe in it.

DR. KERLEY: I am very glad to hear Dr. Barnett's paper and commend the impartial way in which he went about investigating this problem. But as yet he has not accomplished much, and we who have treated this disease for many years cannot expect it. I recall the results of some very careful observations from the use of vaccines carried out in the Nursery and Child's Hospital; 40 to 50 per cent. of all the cases from New York City, including those from Bellevue Hospital, are brought to this institution. Observations were made in 36 cases. Plan of the dosage was the same as that made by Dr. Hamilton. We began with 50,000,000 dead bacteria of a stock vaccine and then increased 10,000,000 every five days.

Eleven months' duration, 7,050,000,000 for cure.

Two years' duration, 6,610,000,000; cultures still positive.

Four months' duration, 4,030,000,000; no result.

In one case 8,400,000,000 were given, and cure resulted in one year and two months. No other case showed negative cultures at five-day intervals.

Treatment under three months' duration:—

3 cases received 1,000,000,000 to 2,000,000,000
3 cases received 3,000,000,000 to 4,000,000,000
8 cases received 4,000,000,000 to 6,000,000,000
6 cases received 6,000,000,000 to 8,000,000,000

Judging from the results vaccines do not promise very much. Some cases get worse, some cases recover and others act as if no vaccines had been given. On the whole, they do very little, if any, good. We have had to treat a great many of these cases and we have used the whole list of disinfectants and the various means of irrigation and we have arrived at the conclusion that there is nothing better than irrigating the vagina three times a day with one quart of water containing boric acid solution and then thoroughly drying the parts; then dust with 10 per cent. boric acid, starch and zinc. These work better than the irritant applications.

An interesting question is, What becomes of the hundreds and hundreds of cases that remain untreated? It is a disease that appears to be cured spontaneously after a certain period. If the infection becomes attenuated and a certain line of treatment is followed out, the treatment is given the credit. A wider observation will disprove that a specific has been found. I thoroughly believe that gonorrheal vaginitis is a self-limited disease and that something takes place during the child's life that makes the vagina less hospitable for the gonococcus. In children from six weeks to one year the infection is most virulent—after this age it becomes less and less frequent. The mild cases must also be taken into account. I recall one private case where cure resulted after three weeks' treatment. This was an exceptionally mild type of infection and was one out of many hundreds of cases.

Dr. Koplik: Inasmuch as I am the sponsor for these special classes in the dispensary it behooves me to say a few words in reference to them. I think they are a step in the right direction. Gonorrheal vaginitis is a sort of mild pest in children. The child goes around infecting others. Infection takes place in a simple way—clothes, toilet or manipulation. There is a great social side to this question. The ordinary way of treating it in the dispensaries is routine. At the same time these children are infecting others, and I personally remember at least 4 fatal cases of peritonitis caused by the gonococcus travelling by way of the vagina and tubes. We never know when this disease can flare up and take a fatal course. Therefore special classes and clinics should be established all over the city for the treatment of these cases. These children should be segregated, kept away from other children and eventually the authorities will take up this phase of the problem. In European clinics you will rarely find a *docent* who thinks much of a gonorrheal vaginitis. At times articles appear in the German journals, but the matter is treated lightly. Why should these children become infected in institutions? The ward is carefully disinfected, the nurses are well-instructed, and still one or two cases flare up. Epstein actually introduced the gonococcus into the vagina of babies and failed to infect them. There seems to be something in the secretions that protects the individual, but no one can say what it is. No institution has the right to keep these children out. In Mt. Sinai Hospital the rule is, that these children are admitted to the hospital and certain precautions are exercised. If, in spite of these precautions, one or two children are infected we say we have done our best, the best we could, but we have not deprived a sick child of the necessary care that it needs. We can limit the spread of the disease in the ward. To-day I discharged a case of specific vaginitis which had had pneumonia. I feel confident at the present time that no child has been infected from this one. On the other hand, we have a number of children with simple vaginitis. These are not gonorrheal and therefore should not be isolated from the other children. Some of the cases free from so-called gonorrhea show the gonococcus. I would like to know why many simple cases among the poorer classes are really considered gonorrheal. An educational campaign should be carried on among doctors and lay persons. As regards vaccine therapy and complement fixation, I think we ought to have some method by which we could tell whether a child should receive vaccine therapy or not, according to the method of Wright. We must select our case and know how much to inject in that particular case. We cannot yet speak of the efficacy of this treatment. It is in its infancy. I agree with Dr. Kerley, that if you can succeed in keeping the patients clean and keep them in condition where they are less infectious to other children than they otherwise would be, you will have done about all you can do. We must have special classes and outfits where we can treat them with a good deal of individual attention, as Dr. Barnett has done. It was surprising to me how easily the children submit to treatment in Dr. Barnett's clinic. You could hardly hear a sound from the patients. The nurses are kind to the children and they readily submit to examination and treatment. This is all due to the fact that the clinic is conducted in such a careful way. The dry method has been tried in Germany. I do not know if it could be made more successful. The tampon treatment has been tried in Germany. The tampons consisted of cocoa butter with an antiseptic and were left in the vagina for two to three days, so that the application could be in contact with the gonococcus for as long a time as possible. Specific vaginitis is curable, otherwise we would have sterility broadcast. The amount of sterility caused by gonorrhea in the female must be very small (10 to 15 per cent.) as against Neugerath, who placed it very high. Therefore, outside of the cases of peritonitis, ophthalmia, etc., it is a question whether this disease leads to any serious results. It is a sort of a pest. At the same time measures for segregation should be instituted. Dr. Barnett is to be complimented on the way he has carried out this part of the work. In reference to his mode of treatment, I carry it out in my office. I have a case now which is most rebellious. Some cases are mixed infections, chiefly the streptococcus, with profuse discharge from the vagina. In view of the complication of arthritis, peritonitis, etc., I think these cases should get special attention. The Board of Health should be careful and practice segregation.

Dr. Chapin: Will someone say whether the gonococcus in the child is of a different strain from that in the adult? We seldom see children with ophthalmia or infected tubes.

Dr. Wollstein: At the Babies' Hospital we solve the problem by prophylaxis. We have done this only by the exercise of the greatest vigilance. Every girl baby that is to be admitted has a vaginal smear taken and examined in the laboratory. If pus cells or the gonococcus are found, the child is not admitted unless it is a case that needs immediate treatment. It is then isolated. The smear must be absolutely free from pus cells and Gram negative bacteria. Out of the 1,200 babies who applied for admission in the past year 63 cases, or .5 per cent., were turned away for this reason. Some years ago, before these precautions were taken, we had frequent epidemics of vaginitis. These have been reported by Dr. Holt. At one time we treated the patients by stock and autogenous vaccines and we could get no results which justified our going on with the work. Occasionally a case does poorly. Spalding has called attention to the long periods of latency and numerous recurrences in this prolonged disease, and it has occurred that cases have been admitted during this latent period. A child is admitted who has a clean smear from *within* the vagina—taken from within to exclude a possible stool contamination. (If such a smear is negative for pus cells and Gram positive cells an infection can almost always be ruled out.) Occasionally, when the child with a clean smear is admitted, she later becomes positive; we then make a weekly examination of smears from every girl. At the end of the first week it would be clean. At the end of the second week a few pus cells might be found. At the end of the third and fourth weeks the gonococcus might be present. During the time one such child stayed in the hospital no other positive cases were present in the building. This child was sent home and no other cases developed. We send such infected children home with the clothes they wore in the hospital.

Only a small percentage suffer from simple vaginitis. Very few, from 3 to 5 per cent., are due to the staphylococcus or streptococcus. They clear up quickly and are not as persistent as the gonorrheal type.

In referring to Dr. Chapin's question, I have had no experience and know nothing of the different strains of the gonococcus in the infant and adult.

Dr. Herbert B. Wilcox: I wish to mention my experiences at Bellevue. We have a vaginitis ward with from 20 to 30 cases. We employ a method of prophylaxis to prevent it from running riot. The children are examined on admission and kept for about seventy-two hours, or until three vaginal examinations have been made. The first smear is taken from the introitus vaginæ. If pus cells are present mercuric bichloride is introduced into the vagina by a medicine dropper and as the fluid flows back it is collected on a slide and examined. In this way we detect a great many cases which otherwise would escape. Then a smear is taken directly from the cervix and we frequently demonstrate bacteria in cases that have been negative in the other two examinations. Two recent cases are quoted in which the third smear from the cervix was positive. At the Manhattan Eye and Ear Hospital conditions have been much better since the systematic examination was introduced. It was always surprising and interesting that the presence of a vagina case produced trouble in other parts. Most of our so-called simple vaginitis cases turned out later to be true cases of gonorrheal vaginitis. For treatment we have tried everything we know of. The various injections, packing the vaginal tract, stock, autogenous and other vaccines from a great variety of strains. The autogenous vaccines gave us the best results. One case discharged as cured came back to us in two weeks with a profuse vaginal discharge, which was found to be due to a piece of packing that had been left in the vagina.

Dr. Louis Fischer: I am very much interested in the question of secondary vaginitis. We have at the Willard Parker Hospital hundreds of cases of scarlet fever, 10 per cent. of which have vaginitis. This vaginitis, accompanying and following scarlet fever, is very disturbing and is just as difficult to treat outside as inside of the hospital. A few years ago Dr. Huddleston used stock and autogenous vaccines and met with little success. At present locally we use alum, boric acid, potassium permanganate. In a series of cases some benefit was given by constitutional treatment with iron, arsenic and cod-liver oil. As a rule, the children that have vaginitis benefit by constitutional treatment and change of air.

Dr. Goodman: I have very little to add to what has already been stated to-night. It seems to me that any organism that can cause the loss of an eye or produce a general peritonitis, or even death, should receive very serious consideration. In the German Hospital we use the same method that Dr. Wollstein has reported. Every female child has a vaginal smear made from vagina and cervix on three successive days and the child is then admitted to the general ward. We have a little observation ward, where the child may remain several hours before admission. If the organism is present the child is retained there and if not in a serious condition is sent home. Every child has its own thermometer and bed-pan and the vaginal pads are burned. In reference to treatment, I think that some cases get well with certain remedies, while some do not get well at all. I have not seen good results where mothers did not coöperate.

Dr. Silver: A child was brought to the Vanderbilt Clinic with severe pain in the right iliac fossa. I could find nothing on examination. No appendicitis or typhoid. This pain remained constant in spite of anything we could do. The temperature ranged from 100° to 101° F.; pulse, 120. Nothing was said to me about a discharge. Sent to Roosevelt Hospital and returned with the diagnosis of vaginitis. This, then, was a case of mild peritonitis from spread of a vaginitis by way of the tubes.

Dr. Hamilton: I was much interested in hearing this discussion. It is surprising to hear the results of the complement fixation test. Also the results of Dr. Barnett's treatment. Whether vaginitis is a self-limited disease is questionable. I have had some patients come to the clinic for seven years. I do not believe much in the local treatment. Just keep the patients clean and dry and train the mother to do so and reserve the irrigations, etc., for acute cases. We have obtained very good results with vaccines *in very recent cases.* In the cases of long duration the results are not as good as we had hoped for. I think that some cases will not be benefited by anything in the world. Vaccines have a part in the treatment of this disease. We must put our vaccine therapy on a scientific basis (opsonic index) and prove it by the complement fixation test. I am still enthusiastic in the treatment of *recent* cases by vaccines.

DR. GEORGE DOW SCOTT: I have found the stock vaccines to be the best. In arthritic cases the vaccines work admirably; in other cases they do not. You may smile at this suggestion, but we have had excellent results by washing the vagina with potassium permanganate, then taking some warm pineapple juice and injecting it into the vagina, then applying argyrol. This pineapple juice is excellent and I wish some of those present would try it.

DR. BARNETT: The changes in the cervix are so characteristic that one can tell from its appearance through the endoscope the kind of a smear to expect.

LARYNGEAL TUBERCULOSIS.—In the *New York Medical Journal* for August 17, 1912, von Ruck states that, in his experience, tuberculous changes in the larynx are, in cases of pulmonary phthisis, far more frequent than is generally recognized. Slight degrees of thickening, which some physicians would accept as catarrhal, are not infrequently tuberculous in nature, and should suggest to the laryngologist the propriety of a physical examination of the chest. Early tuberculous laryngitis, in von Ruck's opinion, causes, as a rule, no definite, or only slight, subjective symptoms. (Many of von Ruck's cases apparently correspond to those of "banal" laryngeal catarrh, recognized by Poncet as instances of "tubercular inflammation"—*i.e.,* of non-specific lesions induced by the poisons of the bacillus, but without the local presence of "tubercles." See *Universal Medical Record,* September, 1912.)—*The Universal Medical Record.*

MISCELLANEOUS.

DEPARTMENT OF AGRICULTURE ADVISES THAT MILK BE PASTEURIZED AT LOW TEMPERATURES.

In order to determine the best way of pasteurizing milk so as to kill the disease germs and yet not give the milk a cooked flavor or lessen its nutritive value, the Department of Agriculture, through its Dairy Division, has been conducting a series of experiments, treating milk at different temperatures and for different lengths of time. According to the report on these experiments in Bulletin 166 of the Bureau of Animal Industry, when milk is pasteurized at 145°F. for thirty minutes the chemical changes are so slight that it is unlikely that the protein (muscle-building element) or the phosphates of lime and magnesia are rendered less digestible than they are in raw milk.

Moreover, from a bacteriologic standpoint, pasteurizing at low temperatures is found to be more satisfactory than pasteurizing at high temperatures. According to Bulletins 126 and 161, where low temperatures are used, the majority of bacteria that survive are lactic acid organisms, which play an important part in the normal souring of milk. When milk is efficiently pasteurized at high temperatures, the bacteria which survive are largely of the putrefactive kinds, and milk so treated if kept for any length of time has a tendency to rot instead of sour. From the standpoint of economy, the technologist of the Dairy Division finds that pasteurizing at low temperatures calls for less heat. It is found that it takes about 23½ per cent. less heat to raise milk to the temperature of 145°F. than to a temperature of 165°F. A similar gain is a saving of the ice needed, because it will require 23½ per cent. more refrigeration to cool milk to the shipping point when it is pasteurized at the higher temperature. The Department, therefore, recommends that "when market milk is pasteurized it should be heated to about 145°F. and held at that temperature for thirty minutes."

CURRENT LITERATURE.

Abstracts in this Number by
Dr. Charles F. Farr. Dr. Jerome S. Leopold.
Dr. William Lyon.

PATHOLOGY.

Findlay, Leonard: The Site of Entrance of Tubercle Bacilli. (*Festschrift for O. L. Heubner,* 1913, p. 211.)

Findlay's conclusions are as follows:—

(1) In rabbits tuberculosis can very easily be caused by the inhalation of air containing tubercle bacilli.

(2) On the other hand, it is very difficult to cause tuberculosis in rabbits by feeding experiments unless some of the material is inhaled.

(3) Inhalation tuberculosis is very easily caused when tubercle bacilli are introduced by means of the stomach tube. This method of experimentation is therefore of very little use.

(4) In opening the abdomen the peritoneum is very easily infected. Therefore this method of introducing tubercle bacilli into the stomach cannot be used.

(5) The best method to use in feeding experiments is to introduce the tubercle bacilli into the stomach in gelatin-covered capsules.

(6) The theory that tubercle bacilli can gain entrance into the system through an intact intestine wall is not supported by animal experimentation. Jerome S. Leopold.

SURGERY.

Wilcox, Dewitt G., M.D.: Head Injuries of the Newborn. (*Boston Medical and Surgical Journal,* April 17, 1913, p. 568.)

The recent postmortem findings of so many meningeal lacerations of the newborn opens a new and wide field for thought, investigation and treatment. Conservative estimate places the incidence of intracranial hemorrhage in forceps-delivered infants at 30 to 40 per cent.; and while many of these clear up without immediate or permanent symptoms, there are sufficient grave results to warrant careful consideration.

The author mentions the greater safety, to both mother and child, of Cæsarean section rather than prolonged and severe forceps delivery, and believes that a majority of still-births recorded as asphyxia, inanition, etc., are really due to intracranial lesions. He describes the pathologic cycle which follows this type of hemorrhage in those who survive the initial shock, and advises operation as soon as diagnosis is established or at some time later, but always before permanent brain injury has ensued. There is surely nothing to lose and much to gain by skilful surgical intervention in these cases. He cites cases where life has been saved by early operation, paralysis relieved by a delayed operation, and nothing accomplished by a late operation. Rapidity of work, conservation of blood and delicacy of technique are the essentials of success in these operations. He feels that adequate treatment of these cases will make the tragedy of an imbecile child in the family, from this type of injury, of the rarest occurrence. WILLIAM LYON.

BATTLE, W. H., AND MAYBURY, B. C.: PRIMARY EPITHELIOMA OF NIPPLE IN A GIRL AGED ELEVEN. (*Lancet,* London, May 31, 1913.)

Battle and Maybury report the very rare condition of epithelioma of the nipple in a girl only eleven years of age. Attacks of pain had been present in the left nipple for ten weeks and there was moderate enlargement. On incision no pus was found and no relief was obtained. At the time of operation the left nipple was the size of a hazel nut, covered with horny material, beneath which was a somewhat softer mass. The tumor was not adherent to the deep structures and there were no inflammatory signs, although palpation caused considerable pain. The axillary nodes were not enlarged. The breast was removed down to the pectoralis major and the microscopic report was squamous-cell carcinoma. Six weeks later there was found a soft painless tumor mass about the size of the original tumor, in the operative scar, with a palpable lymph node in the axilla. A radical operation was performed, including the pectoralis major and the axillary glands. The microscopic examination showed only chronic inflammation. There has been no recurrence to date. CHARLES E. FARR.

EASTMAN, JOSEPH RILUS: THE FETAL PERITONEAL FOLDS OF JONNESCO, TREVES AND REID, AND THEIR PROBABLE RELATIONSHIP TO JACKSON'S MEMBRANE AND LANE'S KINK. (*Surgery, Gynecology and Obstetrics,* April, 1913, p. 341.)

Eastman believes that the so-called Jackson's membrane or parietocolic fold of the peritoneum is identical with the fetal peritoneal fold of Jonnesco and that Lane's kink is at the most but a modified form of the genito-mesenteric fold of Treves and Reid. In other words, he considers that these conditions are congenital and are due to various attachments acquired during the rotation and descent of the cecum. He found the bloodless fold of Treves nine times in 28 fetuses and declares that they are present in about 20 per cent. or more of the cases after the sixth month. The cecum and appendix are frequently enclosed in a pocket formed by this membrane and may be quite adherent to it. Mechanical and inflammatory changes may, and probably do, occur, and are the immediate or exciting causes of the conditions known as membranous pericolitis and Lane's kink.

CHARLES E. FARR.

DRUMMOND, HAMILTON: NOTES OF CASES ILLUSTRATING SOME OF THE SURGICAL ASPECTS OF PERSISTENT MECKEL'S DIVERTICULUM. (*Surgery, Gynecology and Obstetrics,* June, 1913, p. 656.)

Drummond, who is the surgical registrar of the Royal Victoria Infirmary of Newcastle-upon-Tyne, presents the records of 21 cases of persistent Meckel's diverticulum occurring within the last twelve years. Of these, 20 were males and 50 per cent. were under sixteen years of age. It is not possible to accurately diagnose the condition, as the symptoms are precisely similar to those of diseases of the gall bladder, intestine or appendix. The last condition is, of course, the most common. The pathology is practically the same in all. The anatomic form largely determines the resulting lesion in the cases of persistent Meckel's. The lesions produced are of three main types; first, obstructive, the Meckel's acting as a band or causing a volvulus or an intussusception; second, inflammatory, ranging all the way from catarrhal to gangrenous; third, the rarer forms of cyst formation and calculi. About 2 per cent. of all bodies examined show a persistent Meckel's diverticulum. Of the 22 cases described, 16 died. A point which may be of some value in the differential diagnosis is the peculiar condition of the umbilicus in some of the cases. It is raised and dome-shaped and the overlying skin is of a bluish tint and considerably scarred. Unfortunately, these signs are only present in exceptional cases.

CHARLES E. FARR.

CONNELL, F. GREGORY: ETIOLOGY OF LANE'S KINK, JACKSON'S MEMBRANE, AND CECUM MOBILE. (*Surgery, Gynecology and Obstetrics,* April, 1913, p. 353.)

In an article somewhat similar to Eastman's, Connell, who was one of the first to propound the congenital theory of the formation of Jackson's membrane, describes fully the process of development and rotation of the cecum, with the various anomalies that may take place. He concludes that anomalous development offers a rational explanation of these various bands and kinks, and that coincident or resultant inflammation may cause confusion. The term rotation, as ordinarily used, really covers migration, rotation and fixation, one or more of which may be imperfect. The Jackson or pericolic membrane may be due to excessive rotation, delayed migration, or early or anomalous fixation. The Lane kink may be due to excessive or anomalous fixation. The cecum mobile is due to an absence of fixation.

CHARLES E. FARR.

DOWD, CHARLES, N.: HYGROMA CYSTICUM COLI: ITS STRUCTURE AND ETIOLOGY. (*Annals of Surgery,* July, 1913, p. 112.)

The term hygroma cysticum coli has been rather loosely used by many authors in describing cystic tumors of the neck of all types, including lymphangiomas and branchial cysts, but should be confined to those peculiar cystic tumors which have endothelial linings and serous contents and which grow with much power through the tissues of the neck or downward under the clavicle into the axilla or pectoral region. They are usually described as of lymphatic origin and the cysts are sometimes considered to be dilated lymph spaces. There is no sharp dividing line between them and lymphgangioma, but the typical examples of each are distinct. Their endothelial structure and multilocular development differentiate them from any of the other growths in the neck and they have an independent power of growth into the surrounding tissues. Inflammatory and hemorrhagic conditions may supervene, but these are purely accidental conditions. The etiology is obscure, many theories being advanced, but the one most probable seems to be that of congenital sequestration of lymphatic tissue. The author quotes Professor McClure and Professor Huntington to the effect that the lymphatics in the neck region of mammals develop as independent structures which secondarily connect with the veins. This junction may never take place in certain cases and thus cystic growths may arise. A search of the literature revealed 91 cases of hygroma cysticum coli, 35 cases of hygroma cysticum axillare and 11 cases of similar cystic tumors in various other parts of the body. Dowd reports three undoubted hygromas of the neck and a fourth probable one in which inflammatory changes had occurred. These were all seen within the past year. Excision is the only rational treatment, but this is very difficult to execute in many cases. Partial excision will relieve the condition temporarily, but the return growth is apt to be rapid and hard to treat. Unoperated cases are liable to infection with very serious results, to say nothing of the danger from pressure on important structures.

CHARLES E. FARR.

v. KAUTZ, A.: GALL-STONES AND GALL BLADDER DISEASE IN CHILDREN. (CHOLELITHIASIS UND CHOLECYSTITIS IM KINDERSALTER UND IHRE BEHANDLUNG.) (*Centralb. für die Grenzg. der Med. und Chir. Jena,* May 23, 1913.)

The author has made a careful study of cholecystitis and cholelithiasis in children and has found but 15 cases. One was in a newborn child, 5 were between five and ten years of age, and 4 between thirteen and seventeen. In 5 cases the unsuspected gall-stones were found at autopsy, in 2 cases the stones were passed by the bowel following a purge, while in 6 operation was resorted to. In 5 of the cases the gall bladder was removed, with recovery in all. Cholecystitis without stones is very rare. One case, a boy of nine, operated on in the fortieth hour of the disease, showed acute cholecystitis with turbid bile, in which colon bacilli were present. In a girl of thirteen there was found a moderate cholangitis with slight cholecystitis. There was only slight enlargement of the gall bladder and the bile was sterile. A five-year-old boy, suffering with scarlet fever, had an acute cholecystitis without stones and with sterile bile. A boy of thirteen, following an operation for appendicitis, had an acute empyema of the gall bladder three weeks later. A boy of ten with typhoid fever developed an abscess around the gall bladder, then meningitis and finally pneumonia; he had two perforations in the gall bladder without calculi. CHARLES E. FARR.

EDINGTON, G. H.: CONGENITAL OCCLUSIONS OF ESOPHAGUS AND LESSER INTESTINE. (*Glasgow Medical Journal,* July, 1913.)

Edington's cases of congenital occlusion of the esophagus are extremely rare and interesting. The first showed a complete atresia of the esophagus between the seventh and nineteenth rings of the trachea. The pharynx opened into the esophagus, which ended in a blind pouch opposite the seventh tracheal ring, while the lower end of the esophagus was patent up to the bifurcation of the trachea, where it joined the latter and fused with it. There was no appearance of any band joining the two segments of esophagus. The second case also showed a complete atresia, the pharynx ended in a blind pouch at the level of the twelfth ring of the trachea, $1\,{}^{5}/_{10}$ cm. below the cricoid cartilage. The upper segment measured 9 mm. across. The lower segment led up from the stomach to the nineteenth ring of the trachea, was only 4 mm. across and entered the trachea, forming a common tracheo-esophageal tube. There was no communication of any sort, nor any connecting band between it and the blind end of the upper segment. CHARLES E. FARR.

REED, EDWARD N.: INFANT DISEMBOWELED AT BIRTH.—APPENDECTOMY SUCCESSFUL. (*Journal of the American Medical Association,* July 19, 1913.)

Reed reports a most remarkable recovery after exposure of the intestines in a newborn child. At the delivery he noted that the whole intestine, both large and small, was outside the abdominal cavity, having passed through a rupture in the umbilical cord about two inches from the navel. The conditions were of the filthiest and the mass of intestines was covered with straw, feathers, crumbs of food and fecal matter. Because of another urgent call the infant could receive no surgical attention, beyond the ligature of the cord, for two hours. By this time the bowels were matted together with fibrinous adhesions, which were gently separated, and the dirt was washed away with saline so far as was possible. The appendix, although very small, was injured and had to be removed. The intestines were then replaced in the abdominal cavity and the umbilical opening, which admitted the tips of two fingers, was enlarged upward and downward for half an inch and trimmed. The opening was then closed with a layer of buried catgut and silk-worm gut for the skin. The child made an uneventful recovery except for a small stitch abscess.

CHARLES E. FARR.

PERTHES, G.: DEFORMING OSTEOCHONDRITIS IN THE YOUNG. (*Archiv. für Klinische Chirurg.*, Berlin, July, 1913.)

Perthes has had 21 cases of deforming osteochondritis of the head of the femur in children. The disease is hard to differentiate from tuberculosis of the hip, but the process is not tuberculous and is not in the joint itself, but in the head of the femur. The etiology is not known, but may be possibly traumatic. The trouble first appears between the ages of five and ten and is unilateral. The first symptom is the limp. There seems to be little pain, flexion is normal and there is no muscular rigidity, but abduction and rotation are much restricted. There is some tendency to atrophy of muscles and the X-ray shows softening or total destruction of certain areas in the head of the femur. The epiphysis becomes flattened and the head deformed, but the acetabulum gradually adapts itself to the new conditions. The results in all cases seem to be good if reasonable treatment is attained. Extension and massage seem to be all that is necessary and the result is a complete return to normal.

CHARLES E. FARR

KÖNIG, F.: THE CHANGING VIEWS IN REGARD TO SURGICAL TUBERCULOSIS. (NEURE GESICHTSPUNKTE IN DIAGNOSE UND THERAPIE DER CHIRURGISCHEN TUBERKULOSE. (*Med. Klin.*, Berlin, June 15, 1913.)

König emphasizes the fact that the only way to judge accurately of the efficacy of treatment is by years of observation. Moreover, it is absolutely necessary to exclude all of the cases which were not genuinely tuberculous, and this is not always easy to do, *e.g.,* bone and joint tuberculosis require more than simple X-ray proof. The von Pirquet reaction is quite reliable in children, but even a negative test in adults is not to be relied upon with great confidence. Radical removal of a lesion in the bone or joint saves much time and trouble when practicable. The X-ray treatment of tuberculosis is not free from danger and may cause an intoxication similar to the excessive use of tuberculin. König has used the ultra-violet rays from the mercury quartz lamp in place of sunshine and has found it very helpful both in local and general exposures, the eyes and sensitive regions of the skin being protected with black cloth. It first causes a powerful local reaction, which rapidly subsides and leads to marked decrease in the size of the lymph nodes and to the gradual healing of the fistulæ. The general exposures are even more helpful, half a dozen or more children being exposed naked all at once upwards of two hours. A marked improvement in the general health was noted in every case and the lesions of tuberculosis were greatly improved. CHARLES E. FARR.

MEDICINE.

KRASNOGORSKI, N.: EXUDATIVE DIATHESIS AND VAGOTONY. (*Monats. für Kinderhk.*, June 20, 1913, p. 129.)

Eppinger and Hess consider the symptoms observed in Czerny's exudative diathesis due to vagotony. Based on this hypothesis Krasnogorski used atropin in the treatment of this class of cases. The author at first began by giving 3 drops daily of a 1:1,000 solution of atropin sulphate. He then increased the dose until as much as 13 drops daily were given to infants a few weeks old. This dose was kept up for weeks and months without any untoward effects. Six cases of very marked eczema were treated by this method, all of which were cured or markedly improved. Atropin also works well in the chronic bronchitis and pneumonias often seen in exudative diathesis.

Krasnogorski concludes that infants have a very high tolerance for atropin. JEROME S. LEOPOLD.

CONRADI, ERICH: DIAGNOSIS OF TUBERCULOSIS IN ANIMALS BY MEANS OF THE VON PIRQUET REACTION. (*Münch. Med. Woch.*, July 22, 1913, p. 1,592.)

Heretofore it has taken six weeks to determine whether a guinea pig that has been inoculated with suspected tuberculous material becomes infected or not. Conradi inoculates a guinea pig in the usual way, and after an interval of from ten to thirteen days performs a von Pirquet reaction on the guinea pig. A positive reaction means that the pig is tuberculous. The reaction is confirmed by performing an autopsy on the guinea pig.

JEROME S. LEOPOLD.

GERSTLEY, JESSE R.: THE RELATION OF THE DIET TO THE COURSE, BLOOD FINDINGS AND NEPHRITIS IN SCARLET FEVER. (*Monats. für Kinderhk.*, June 20, 1913, p. 121.)

Gerstley, writing from Knöpfelmacher's clinic in Vienna, has confirmed the results of Pospischill and Weiss, that children fed a meat diet in scarlet fever are no more likely to develop nephritis than those kept on a milk diet.

Furthermore, the meat diet in Gerstley's cases seemed to have a beneficial influence on the red blood cells. The reviewer has made similar observations.

JEROME S. LEOPOLD.

MEYER, L. F.: THE PREVENTION OF INFECTION IN INFANTS' HOSPITALS. (*Zeits. für Kinderhk.*, May 3, 1913, p. 233.)

Meyer has written a very interesting and instructive article on the prevention of infection from Finkelstein's Kinderasyl in Berlin. During the past year infants suffering from grippe, pertussis, diphtheria, and other infectious diseases have been isolated by the "Box" system. In this way Meyer clearly shows that epidemics and reinfections can easily be avoided. Pictures of the "Box" wards and many charts accompany the article.

JEROME S. LEOPOLD.

TRUMP, PROFESSOR, DR.: THE DIAGNOSIS AND THERAPY OF OXYURIASIS. (*Zeits. für Kinderhk.*, July 5, 1913, p. 205.)

Trump calls attention to the fact that at times it is very difficult to tell whether or not an oxyuriasis is present. To facilitate the diagnosis Trump has made use of a reaction similar to the Moro salve reaction in tuberculosis. An ointment is made, consisting of about 100 oxyuris worms to 1 gram of ointment. This is rubbed into the skin for one to two minutes. If an oxyuriasis is present a positive reaction is obtained in from fourteen to twenty-four hours similar in appearance to the Moro reaction. Although only a very small number of cases have been tested in this manner by Trump, he is very enthusiastic about this method of diagnosis.

Treatment, according to Trump, is very unsatisfactory. Santonin, in order to give results, must be given in almost toxic doses. Cold water rectal irrigations in the knee-chest position do not reach the site of all the parasites. A new and efficient method of treatment is much desired. JEROME S. LEOPOLD.

THERAPEUTICS.

TALBOT, FRITZ B., M.D., AND SISSON, WARREN R., M.D.: SOME FACTORS WHICH INFLUENCE THE EXCRETION OF FORMALIN IN THE URINE OF CHILDREN AND INFANTS TAKING HEXAMETHYLENAMIN (UROTROPIN). (*Boston Medical and Surgical Journal,* April 3, 1913, p. 485.)

The authors' attention was directed to this subject through having a relatively large number of cases of pyelitis under observation in their wards. Other observers had found a wide variation in the number of adults capable of breaking up the drug and excreting free formalin, but in the 44 children of this series a positive reaction was found in all cases at some period of the experiments.

Four hundred specimens of urine were examined, after the giving of varying doses of urotropin, and the positive results were almost wholly limited to acid urines. A complete tabulation of the work is presented and the following conclusions drawn:—

(1) That all children are capable of breaking down hexamethylenamin.

(2) That they all consequently excrete formaldehyd.

(3) That relatively large doses are often necessary before excretion of formaldehyd takes place.

(4) That, as pointed out by Jordan, "the more acid the urine the greater is the decomposition of urotropin and excretion of formaldehyd." Since it has been shown by other observers that the antiseptic power of urotropin is dependent, not upon the hexamethylenamin, but upon the presence of free formaldehyd, we can further conclude—

(5) That urotropin should not be given with drugs that cause the urine to turn alkaline.

(6) Finally, we believe that to insure the efficacy of the drug, specimens of the urine after the administration of hexamethylenamin should always be examined for the presence of free formaldehyd. WILLIAM LYON.

BOOK REVIEWS.

PATHFINDERS IN MEDICINE. By VICTOR ROBINSON. With a Letter from Ernst Haeckel and an Introduction by Abraham Jacobi. New York: Medical Review of Reviews, 1912.

This is a very interesting and entertaining book, worth reading from cover to cover in spite of the somewhat self-conscious style, which, however it may seem to strive for a catchy phrase, yet has the distinct merit of compelling attention.

And to bring to the attention of practitioners the ancients in medicine and the pioneers who opened the pathways that are now our thoroughfares is a worthy effort and should bring a broadening of vision which all of us need. Galen, Aretæus, Paracelsus, Servetus, Vesalius, Ambroise Paré, Scheele, Cavendish, Hunter, Jenner, Lænnec, Simpson, Semmelweiss, Schleiden, Schwann and Darwin—all are recreated and made individual to us in the pages of Dr. Robinson's book. Few of us who read will allow Aretæus to become "the forgotten physician" again. Nor will the clear image of the apothecary Scheele fade, nor that of Cavendish, the queer, misanthropic chemist, who never accomplished that "pleasing miracle," which is "to meet a young lady one night and to have his arm around her waist the next night." And many of us will consult our Bartlett to locate the source of the multitude of erudite quotations Dr. Robinson has introduced or kindled by the vision of the diver "when, a prince he rises with his pearl" will get out our Browning and reread "Paracelsus" with new and deeper understanding.

LECTURES ON DISEASES OF CHILDREN. By ROBERT HUTCHINSON, M.D., F.R.C.P., Physician to the London Hospital and Physician, with charge of Out-Patients, to the Hospital for Sick Children, Great Ormond Street. Third edition. Pp. 404. Illustrated. New York: Longmans, Green & Co.; London: Edwin Arnold. 1913.

A book in the conversational form for the quiet evening at home or any moment when conscience pricks, but one's medical reading must be exhibited in its most palatable form. Here we have ripe experience and moderate statement; a book whose chapter on the examination of the child should be in the hands or presented to every interne or young physician who is on the threshold of his work with children.

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EDITORIAL.

THE ORGANISM OF POLIOMYELITIS.

Five years ago we knew little more of the nature of poliomyelitis than we knew sixty odd years before that when Jacob von Heine first described the disease. True, Medin had written illuminatingly of the disease in 1890, and others, notably Charcot and Strumpell, had contributed their bits to the clinical data which Wickman, adding his vast experience with the Sweden and Norway epidemics to the while, classified carefully and elaborately, giving us for the first time knowledge of the abortive cases. Yet of poliomyelitis itself, the essence of the disease, even the work of these men, and our own severe epidemics, had given us little new light.

It was only with the successful transmission of the disease to monkeys by Landstemer and Levaditi, and Flexner and Lewis, in 1909, that rapid progress was begun. And how rapid that progress has been amazes us when we look back and see what has been accomplished in the past four years!

In the first place, the disease was demonstrated to belong to the infections; and the experimental disease was found to be similar clinically to the human affection, and to yield identical lesions, both gróss and microscopic. It was, however, a much more severe affair in the monkey than in the usual human case, and, as might be expected, with the passage of the virus from animal to animal it has increased in severity. So that while the human disease claims 10 to 15 per cent. mortality, the experimental dooms nearly every animal affected to death.

The demonstration of the passage of the infective agent through filters of the Berkefeld type dismissed for good and all the various bacteria which earlier observers had confidently thought were etiologic factors. The localization of the virus in brain cord, intervertebral ganglia, regional lymph nodes, blood, spinal fluid,* nasal and pharyngeal mucous membranes, and nasal, gastric and intestinal washings, together with the observations by the pathologist of general visceral lesions, such as focal necroses in the liver, changed our conception of the disease from that of an essentially nervous affection to that of a generalized constitutional disturbance, whose main injury, when it is inflicted, falls on the nervous organs, but which may run its course, as it probably does in the abortive cases, without such local injury.

The immunity noted in recovered monkeys and the neutralization of known virus by the serum of such animals and by the serum of human beings who have had poliomyelitis, even after so long an interval as thirty years, shed light upon the comparative freedom of adults and led to speculation as to whether many immune persons do not exist—persons who have had the constitutional but not the nervous manifestations of the disease. And this in its turn has led to the well-defined feeling which has much of probability to recommend it: that poliomyelitis may after all, be a very mild disease in the great majority of its incidence; that vastly more persons undergo it than has previously been supposed; that a few exhibit the paralysis formerly considered the essential characteristic of the trouble; that still fewer die with rapidly progressive symptoms; that most persons show only a mild illness, and that all who recover, acquiring the well-recognized immunity, when they grow up create a body of protected adults.

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* The former in amounts of 20 c.c. or more and the latter only while still opalescent.

Whether a proportion of these immune individuals can be carriers of the disease as well is a question upon which experimentation has thrown light. For not only have individuals with paralysis apparently transmitted the disease more than two years after the original attack, but persons in contact with poliomyelitis have been shown to harbor the virus in the secretions of the nasopharynx. That is all, so far, but in connection with the curious relationship of cases along the route of a grocery clerk, for instance, along highways, in localities where never before has the disease been known to exist, the transmission of the disease by human agents and, apparently, also by well human agents, seems conclusively proven.

Of all the experiments designed to prove an insect host, none has done more than show mechanical transference, whether the insects be lice, bedbugs, ticks, mosquitoes, house flies or the biting stable flies, which latter for a time, until Rosenau's and Frost's positive results were offset by conclusively negative ones, seemed quite probable offenders.

And now Flexner and Noguchi, using a culture medium of human ascitic fluid with a bit of sterile sheep's kidney and incubating in this a bit of virulent nervous tissue, anaerobically, have succeeded in isolating small globular bodies about .15 to .2 of a micron in diameter, which grow in chains, or pairs, or in small masses. These organisms, which they have continued to the nineteenth or twentieth generation, still virulent, have fulfilled Koch's postulates. They have been grown from the tissue of an animal affected with the disease; they have, upon inoculation, reproduced the disease in other animals clinically and pathologically and been recovered again from its tissue. Even further have the discoverers gone, fearing that there might be a carrying over from culture to culture of a part of the original virus and they have carried the organisms through several monkeys in succession to eliminate this. So it seems proven that this organism is the true cause of poliomyelitis. Whether it is a bacterium or a protozōon is not yet decisively determined, but the cultural characteristics and the changes in virulence with repeated passing through animals would seem to ally it to the bacteria.

A new realm of parasitology has been indicated; a hope of a future prevention of poliomyelitis aroused.

OBITUARY.

Dr. Frederick Forchheimer, of Cincinnati, died Sunday afternoon, June 1, 1913. With Daniel Drake, and the great line of medical men who have made the name of Cincinnati famous as a medical center throughout the world, his name will be handed down to posterity as one of Cincinnati's greatest physicians.

As a teacher of medicine he made an imprint upon the minds and hearts of his students which will continue with them as a cherished memory as long as any of them may live. As a medical writer his influence on scientific medicine will continue for many generations. As a practitioner of medicine he was beyond doubt one of the greatest men of his generation. His wide knowledge of scientific medicine, his great skill as a diagnostician, his unusual knowledge of therapeutics and, perhaps above all, his remarkable personal magnetism, equipped him as few men have been equipped for the practice of his chosen profession.

Although he died at the age of fifty-nine, at the very acme of his professional career, he had the rare satisfaction, which few medical men receive, of living to experience the pleasure of having his contributions to scientific medicine recognized by medical men throughout the world. He died, as it were, amid the plaudits of his medical compeers.

After a long and active career as a member of the Association of American Physicians, he was elected to the Presidency of this society in 1911, and he received the honorary degree of Doctor of Science from Harvard University in June, 1912.

He had lived to see his medical writings quoted in every text-book on diseases of children and internal medicine that has been written in the last decade, and also to see his great work on the "Prophylaxis and Treatment of Internal Diseases" the recognized standard in this department of medicine. He did not, however, live to see the truly remarkable success of the great four-volume work which he had edited on the "Therapeutics of Internal Diseases," and which was published shortly before his death.

Dr. Forchheimer's early reputation was made as a pediatrician, and he remained until the time of his death one of the

F. Forchheimer

foremost pediatricians of the day. While a very young man, in 1875, he became an instructor in the Medical College of Ohio and shortly thereafter he established a clinic for diseases of children in connection with this college. This was one of the first clinics of its kind established in this country. He afterward became Professor of Diseases of Children in the same college, and from that time up to the time of his death contributed largely to the literature of diseases of children. His book on the "Diseases of the Mouth in Children," published in 1892, was a classic, and is quoted in every text-book on diseases of children which has been written, from that day to this. He was one of the founders of the American Pediatric Society and its President in 1895, and remained an active member of this Society to the time of his death. His last public appearance in a medical discussion occurred before this Society about four days before the beginning of his fatal illness.

At the time of his death he was Professor of Medicine, and the head of that department in the College of Medicine of the University of Cincinnati.

CALCINOSIS.—Under this term Parkes Weber describes (*British Journal of Children's Diseases,* March, 1913) a case of multiple calcareous nodules in a girl of seven. The nodules existed in the subcutaneous tissues of the extremities and the portions of the trunk adjoining. Both Röntgen-ray examination and chemical analysis showed that these nodules consisted chiefly of calcareous matter. The calcium index of the blood obtained by W. Blair Bell's method gave 1.36 as against the normal average of .9. The nodules have at times become inflamed and softened, and adherent to the skin. The child has had a whole series of diseases—scarlet fever, diphtheria, paresis of the lower extremities, skin affection (lichen ruber?), pneumonia, abscess in right axilla and another at the back of the neck; corneal ulcer, and left-sided otorrhea. Tuberculosis and syphilis have been definitely excluded as etiologic factors. The disease does not much resemble myositis ossificans. "The child's condition can be regarded as one of a definite disease, as distinct at least as myositis ossificans and many other diseases."

ORIGINAL COMMUNICATIONS.

WHY DOES THE OPERATION FOR REMOVAL OF ADENOIDS FREQUENTLY FAIL TO RELIEVE MOUTH BREATHING?*

BY H. M. McCLANAHAN, M.D.,
Omaha, Neb.

The lay public has been taught that mouth breathing in children means the presence of adenoids, nothing more, and that certain relief will follow an operation for their ablation. This opinion prevails largely among members of the medical profession, and until beginning this study that was the belief of the writer. For many years I had noticed that the degree of relief from mouth breathing following adenoidectomy varied greatly in different cases—in some very slight, and others prompt and decided. The following incident attracted my attention. On the first of August, 1909, I operated upon a boy eight years old for adenoids. There was slight, if any, relief from the mouth breathing. Because the operation failed to give relief the mother refused to pay the bill. While the mother's contention was correct, I was satisfied that the operation was thorough, that the vault of the pharynx was free from adenoids and that the failure was not due to any fault of mine. To satisfy myself and to determine, if possible, the reason for the failure, I began a study of the effect of this operation in children coming under my observation, not only cases upon whom I had operated, but all who had received the operation. In the examination of children in my office, when I ascertained that a child had been operated on for adenoids, I made a study of the case, taking into account the following facts:—

(1) The facial expression.

(2) The ability of the child to breathe through the nose with the mouth closed.

(3) The appearance of the mouth and throat.

(4) The condition and coaptation of the teeth.

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* Read at the Annual Meeting of the American Pediatric Society, Washington, D. C., May 6, 1913.

In studying the facial expression I was careful to watch the child when it was unconscious of being observed, to note the general contour of the face, the outline of the nose, the size of the anterior nares, the relation of the lips to each other and the relation of the upper lip to the teeth and its length.

Then the child would be requested to close the lips and breathe through the nose. First through both nostrils, then each nostril separately. It was the rule to find the breathing better through one or the other nostril, and also it was my observation that an obstruction in one nasal fossa induced mouth breathing equally as well as when both fossæ were obstructed.

In examining the mouth and throat I would note the shape of the hard palate, its depth, and whether or not it was circular or angular in outline at the vault; then the condition of the throat and tonsils. The pharynx was examined by means of the mirror in all cases and in 12 of the cases I explored the vault of the pharynx with the index finger in order to ascertain by sense of touch the size of the posterior nares. In studying the position of the teeth I was careful to have the child close the teeth and then by separating the lips to note the relation of the upper to the lower teeth. It was this phase of the examination that gave me the most information. In the normal mouth the lower teeth are half the width of the bicuspid in advance of the upper, and the upper incisors overlap the lower, and cusps of all the teeth (except the incisors) are in apposition and proper alignment. In this condition the nasal fossæ are normal in size in so far as bony structure is concerned, with room for the free flow of air into the vault of the pharynx, unless some growth or inflammatory condition be present.

In this manner I have examined 52 children who had been operated upon for the removal of adenoids. I am not able to give in all cases the date of the operation. These children ranged in age from six to twelve years. I purposely excluded all cases under the age of six years. Twenty-eight were girls and twenty-four boys. There were more girls than boys for the reason that many of the girls were operated upon for the cosmetic effect. Including my own cases, the operation had been performed by eight physicians. Four of these are personally known to me to be competent operators, men whose practice is limited to the nose and throat. I emphasize this point because the failure to relieve mouth breathing is often attributed to the lack of skill on the part of the operator. Almost without exception I found that the mother was disposed to criticise the operator in all the cases where the result was not satisfactory.

In 28 cases the relief from the mouth breathing was either complete or greatly improved. This was the verdict of the mother and also my belief from the study of the case. Of these cases there were 6 of whom it could be said there was more or less of the adenoid tissue in the vault of the pharynx at the time of the examination, yet the nasal breathing was quite free. But most interesting is the fact that in these 28 cases there was fairly normal coaptation of the teeth. In 1 there was coaptation of the incisors without overlapping, but this child (a boy of eight years) was not a mouth breather, but in all upper and lower teeth coaptated.

In 24 of the cases the operation was a failure in so far as nasal inspiration was concerned. Three of these cases had been subjected to two operations and 1 had been operated upon three times, in each case by a different surgeon. In 20 of these 24 cases I am satisfied that the failure to relieve mouth breathing was not due to faulty technique upon the part of the operator or to recurrence of the adenoids, but to anatomic conditions in the superior maxilla. In the other 4 there were adenoids in the vault of the pharynx at the time of my examination, due either to recurrence or faulty technique. In these cases mouth breathing was due to obstruction in the pharynx and not to defective development. In 6 of the 24 cases there was decided hypertrophy of the tonsils, but I do not believe these caused the mouth breathing. However, I may say in passing, that the history was that all of these children snored during sleep. In all of the 24 cases there was bad coaptation of the teeth as well as distinct evidence of the maldevelopment of the superior maxilla, and the other bones in intimate relation to it, namely, the vomer, palatine, and turbinal bones. The type of malformation in 20 of the 24 cases was as follows:—The hard palate was deep and either circular or angular. There was retraction of the mandible due to its being drawn downward and backward and consequent apparent lengthening and actual narrowing of the superior maxilla, and in all of this number the upper lip appeared short and could be brought in coaptation with the lower lip only by a strong muscular effort. This is the typical so-called adenoid face, but the appearance is due to defective development of the upper jaw.

Whether this maldevelopment is primarily due to adenoids in infancy occluding the vault of the pharynx, necessarily compelling mouth breathing, or is a congenital defect, or due to other causes, is not the question. This phase of the subject was so well presented in the series of articles in the ARCHIVES OF PEDIATRICS for January and February, 1913, that I purposely eliminated from this paper a discussion of the etiology of the deformity.

The clinical fact is that some children will receive prompt and decided benefit from the removal of adenoids, whereas others will not. When there is an obstruction in the nasal fossæ the result of the high-arched palate narrowing its lumen or deflection of the nasal septum or thickening of the turbinates or neoplasms, one or all of these conditions lessen the capacity of the nose as a breathing organ. In these cases but slight relief will follow removal of adenoids because the obstruction is in front of the vault of the pharynx. The clinical evidence of this anatomic condition is the appearance of the hard palate and the imperfect coaptation of the teeth. Indeed, with bad coaptation of the teeth there is necessarily a deformity of the superior maxilla.

As a result of this brief study the writer is entirely convinced that it is possible to determine in advance whether or not relief from mouth breathing will result from the operation of adenoidectomy. In a number of recent cases upon whom I have operated, and cases operated upon by other physicians whom I had examined, I have been able to say in advance whether or not the operation would give relief to the mouth breathing, and this opinion has been verified by an examination of the case after the operation. I do not wish to be understood as saying that children with defective coaptation of the teeth should be deprived of an operation if adenoids are present. There are other valid reasons for their removal aside from mouth breathing, but in this class of cases the operation should be the preliminary step in the treatment, and in justice to these children the parents should be informed as to the nature of the deformity and of the probability of relief by proper treatment. Five of the cases included in the above list have been under treatment for the correction of the deformity. In three of them the benefit from treatment has been very decided. Two are now under treatment. I have here a plaster cast of one of these cases. The second was made just one year after the first and illustrates very clearly the decided improvement. My conclusions from the study of these cases are as follows:—

(1) A careful examination of the case before operation will determine with reasonable certainty the degree of relief that will follow the removal of adenoids.

(2) Where there is a deformity in the superior maxilla a frank statement of the facts will relieve the operator from unjust criticism.

(3) Where anatomic defects exist parents should be appraised of the facts and given the opportunity to have corrective treatment instituted by the orthodontist.

(4) The best evidence of such defect is malcoaptation of the teeth.

FORMS OF MENTAL DEFECT.—The lecture by Langmead, read before the Medical Officers of Schools Association, in November, 1912, is now published (*School Hygiene,* February, 1913). An etiological grouping is impossible at present, and the best is division into (1) primary and (2) secondary, with these varieties:—

Primary:
  Genetous or simple (unclassified).
  Microcephalic.
  Mongolism.
[Epileptic?]
Secondary:
  Traumatic, vascular toxic, infective (paralytic).
  Sclerotic; atrophic, macrocephalic, nodular or tuberous.
  Hydrocephalic.
  Syphilitic.
  Amaurotic family idiocy (infantile cerebral degeneration).
  Ductless gland defect: thyroid (cretinism), suprarenal, genital, pituitary, pineal.
  Sense deprivation (isolation).
  Mentally defective (feeble-minded) children.
  Morally defective children.
  Idiots savants.

Of these not more than a tenth can be regarded as secondary. Langmead does not believe that we can label a child as defective in mind by any fixed test or series of tests, however carefully thought out.

THE AMMONIACAL DIAPER AND ITS CORRECTION.*

BY THOMAS S. SOUTHWORTH, M.D.,
New York.

The occurrence and persistence of a strong ammoniacal odor upon an infant's diapers is noted with sufficient frequency to remove it from the category of rarities. If I mistake not, it has usually been ascribed to decomposition of the urine after its passage. When the odor is detected by the physician inquiries are commonly made as to the length of time since the diaper was removed and injunctions are issued to the mother to see that the diaper is changed promptly when it is wet.

No one of our American text-books deals with this phenomenon, so far as I have been able to determine, or offers suggestions for its correction. It is therefore probable that the condition has not received any general attention. For my own part, I must admit that while I have long been familiar with the ammoniacal diaper, I have only within the last two years understood its etiology or recognized its indications in the dietetics of infancy. While this enlightenment might have come earlier had my search chanced to follow the right channels, the fact that the condition has not found its way into our text-books has led me to think that others may have no solution for this problem, and that it may be admissible to discuss the question and relate several cases in point.

Case A. Female child. Placed under my care August 25, 1911, when she was twenty-one months old. For ten days she had had digestive disturbances, loose movements, and fever. Her temperature when first seen was 104°F. As soon as a specimen of urine could be obtained, microscopic examination readily diagnosticated a pyelitis, for which she was immediately placed under treatment. Owing, however, to the frequent bowel movements, daily observations of the diapers were necessary, and it was noticed that they always had a strong ammoniacal odor. This, however, abated under the administration of potassium citrate, which was employed in considerable doses for the cure of the pyelitis.

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* Read at the Annual Meeting of the American Pediatric Society, Washington, D. C., May 5-7, 1913.

Paradoxical as it seemed to be that a medication which would cause alkalinity of the urine would also act to reduce the production of ammonia, such appeared to be the case, and, indeed, the mother wrote me later in the fall saying that she had several times attempted to discontinue the potassium citrate, but had been forced to give one or two doses daily because otherwise the ammoniacal odor would return. A number of sporadic inquiries among medical confrères elicited no satisfactory explanation, and although the matter was constantly in mind, the quest lapsed until the occasion arose for a careful rereading of Keller's monograph upon "malt-soup." Here I found what I desired in his introductory recapitulation of his previous work upon the ammonia excretion of infants suffering from gastrointestinal disturbances.

Before discussing this, however, let me add further details of Case A. Her history showed that she was nursed for five months, and was thereafter entirely bottle-fed. The mixture given was more than half top milk, derived from a rich Jersey milk. After having apparently done well on this for two months she began to show mucus in her stools, and develop temperature from time to time. A malt-soup mixture was substituted by the family physician for about two months, and again followed by granum gruel and Jersey milk. At ten months of age she was given undiluted Jersey milk, and was considered to have done fairly well until the series of disturbances extending over several weeks, which culminated in the discovery of her pyelitis. During this latter period the ammoniacal odor of the diapers was noticed. The child had suffered, and still suffers at times, from seborrhœic eczema. After the disappearance of the ammonia, which was facilitated by the use of a milk less rich in fat, she still had periodical disturbances of digestion of a so-called bilious type, but has recently been free from the latter since the milk given her has been limited to a pint of skimmed milk daily.

CASE B. Female, native of Ecuador. Referred to me by Dr. Snyder, of Birmingham, Ala. Seen first on October 28, 1912, at the age of fourteen months. She had been nursed seven months, and while so nursed was in good condition. Then weaned rapidly and fed on half cow's milk and half gruel. This was followed by indigestion and disturbance of the bowels. A peptogenic milk powder mixture, made up with the usual amount of cream, was then tried. Shortly after, an ammoniacal odor of the diapers was noticed, which had now persisted about three months, although the mixture at present was made up with plain milk, as the cream did not seem to agree. The child weighed 19 pounds and 4 ounces, was pale, restless, slept poorly, and had movements only when assisted. She frequently showed seborrhœic eczema. The stools were pale, constipated, somewhat large, and often contained mucus.

With a definite reduction in the fat, digestion was better, she slept more, and was less restless and irritable. The ammonia odor tended to disappear, but returned when an effort was made to increase the fat. Final disappearance of the ammonia was doubtless also favored by the use of considerable lime water in the food mixtures, and milk of magnesia as a laxative. After several attacks of cough and temperature, which, owing to a house epidemic, were diagnosed as grippe, but in which the temperature usually subsided on clearing the bowels and reducing the fat in the food, skim milk was resorted to, with an increase of other articles in the diet, and the stools for the first time assumed a better color and consistency and were passed without the aid of a suppository. When last seen, April 7, 1913, the child's general condition, color, weight and disposition were much improved, and there had been no return of the ammonia.

CASE C. Male infant. This child I had seen but once, in September, 1912, when it was thriving and exclusively breastfed. Thereafter, the parents occasionally sought advice by letter. On February 2, 1913, when the infant was eight and a half months old, and weighed 19 pounds, 12 ounces, the mother wrote stating that there was a strong ammoniacal odor about the diapers, and inquired whether this was negligible as long as the child gained weight steadily. She also stated that the infant was now getting two supplementary bottles daily, of 7 ounces each, and one complemental feeding of 3 ounces, but the composition of the food was not mentioned. Stools were dull yellow instead of golden color. An older child, having had much difficulty in digesting fat, the mother asked whether the fat might also be at fault in this case.

I at once replied that, although she had omitted informing me of the composition of the artificial feeding, I had no doubt that the ammonia was due to high fat feedings, and that pending the receipt of the formula employed I advised cutting the fat in the mixture down sharply. February 9th (one week later) a second letter informed me that for the past six weeks the infant had been receiving artificial food made from a rich milk, which appeared to be about one-fourth cream. The present formula was:—

Whole milk	13 ounces
Gruel	6 “
Lime water	1 ounce
Milk sugar	½ “

Upon receipt of my letter, 2 ounces of cream had been removed from the top of a *pint* bottle before securing the 12 ounces now used in the formula. Upon the third day after this radical reduction in the fat the ammoniacal odor had temporarily disappeared, diapers worn at night being naturally the last to show improvement. A subsequent but temporary relapse was relieved by removing 6 ounces of cream from a *quart* bottle and increasing the lime water to 4 ounces in a total of 26 ounces of milk mixture.

CASE D. Male, aged three months; weight, 10 pounds, 3½ ounces. Seen March 25, 1913. Was nursed two weeks, then fed on formula of barley water, milk, lime water and milk sugar, which was now at least of fairly appropriate strength. The mother had for some time noticed an ammoniacal odor from the diapers, which was most marked after she had yielded to the insistence of her husband and put for some days into each 3½-ounce feeding 1 ounce of gravity cream. Since the child was not thriving, although now on a fairly rational formula, change was made to a malt-soup mixture, with prompt improvement in weight and disappearance of the ammoniacal odor after four days.

CASE E. Female, seen March 3, 1913. Aged six months. Weight, 12 pounds, 10½ ounces. Nursed for two months, during which time she did well, but thereafter variously fed and over-fed. On and off for some time, a strong ammoniacal smell about the diapers. Mother states she had been unable to increase the plain milk above 18 ounces in a 36-ounce formula without disturbance. Some hard curds in stools. Instructions were given to remove 4 ounces of cream from top of quart bottle before taking milk for the feedings; also, to boil the milk, to prevent formation of hard curds; to substitute dextri-maltose for milk sugar. Four ounces of lime water were to be used, and the skimmed milk in the formula gradually increased. April 8th:

General improvement; stools no longer hard balls, but now once or twice daily; no hard curds. Gain in weight has begun. Ammonia odor decreasing; none noticeable about diaper of previous day, or one freshly removed in office.

These 5 cases permit the deduction that in infancy a noticeable ammoniacal odor to the diapers may yield either to the administration of alkalies, or to a reduction of the fat in the milk mixture, or to a combination of both measures.

In order to understand the etiology of the presence of ammonia in the urine in excessive quantities, we can do no better than to follow more or less the conclusions of Keller, as contained in his personal writings, as well as in those published in joint authorship with Czerny:—

Ammonia does not appear in the urine of normal infants in sufficient quantities to make its presence known by the odor. Such odor is a concomitant of gastrointestinal disturbance, although it by no means appears in all such cases. Under normal conditions, a considerable portion of the nitrogenous constituents of the food is transformed in the organism into ammonia compounds, and then converted by further chemical processes into urea and excreted as the latter in the urine. A large part of the urea is formed in the liver. Since changes in that organ were commonly found in gastrointestinal cases, it was at first suggested that these changes might interfere with urea formation, and lead to excretion of larger quantities of ammonia in the urine.

But an increase of ammonia excretion can have another explanation, which depends upon the chemical property of ammonia to combine with acids as an alkaline base. While under normal conditions all but a little of the ammonia becomes urea and is excreted as such, if under abnormal conditions there is present in the body an excess of unoxidized acids for whose neutralization the available supply of fixed alkalies does not suffice, the ammonia can then take the place of fixed alkalies and form with the acids ammonia salts, which will be excreted in the urine. As the ammonia salts in the urine increase, the urea is correspondingly decreased, and *vice versa*. Therefore, an increased excretion of ammonia can be caused by an increased production and excretion of acids, except that in cases of fat intolerance the fatty acids formed in the intestines are often not absorbed and oxidized normally, but call for an increased expenditure of alkalies for their neutralization.

The abnormal presence of acids may arise from two sources—either from an increased production during the processes of metabolism, or from either an increased formation or decreased absorption in the intestinal tract. The acids ordinarily formed by metabolic processes are readily oxidized in the body, but some of the abnormal acids may be oxidized with great difficulty, if at all. This complicates the problem if the acids are present in excess, for if they be not oxidized they must be neutralized either by calling upon the fixed alkalies or by calling the ammonia into requisition.

Two important factors, therefore, in determining the amount of the ammonia excretion are the condition of the infant and the type of its food. If the condition of the child is such that the normal power of absorbing acids from the intestines or of oxidizing acids is reduced, then other resources must be brought into play, and in consequence ammonia may more promptly appear in the urine. But it is the type of the food which more commonly plays an important part. Neither proteid nor sugar, despite the possible acid fermentation of the latter, has been shown by experimentation to increase the ammonia excretion when given in the food in excess. It is reserved for the fats to play the sinister rôle through the formation of fatty acids. In gastrointestinal disturbance the amount of ammonia excretion may indeed be increased or decreased at will by experimental variations in the quantity of fat given.

Now, were the ability of the organism to produce ammonia unlimited, so that in intestinal cases any amount of acids formed could be fully neutralized, there would be no pathologic effect upon metabolism, and we would have no occasion to speak of an acid intoxication. But this is not the case where conditions are such as to produce acids abundantly. Neutralization is not effected solely by the ammonia, but the fixed alkalies are also called upon to neutralize the unoxidized acids, and thus alkalies are lost in both the urine and the feces.

We may, therefore, assume that where in gastrointestinal cases in infants there is enough ammonia in the urine to reveal itself by its odor, there is also a loss of the fixed alkalies. These are taken from the blood, but since the blood manages to maintain a pretty constant alkalinity, they must eventually be derived from the tissues. Therefore, the less the available alkalies taken into the body the greater the necessary abstraction of alkali from the tissues.

Our therapy of excessive ammonia excretion is, therefore, to be directed toward two ends: First, to prevent the improper formation of acids, and, second, to prevent undue loss of alkalies. The latter (loss of alkalies) can be partially effected as a first step and further injury to the body averted by the immediate administration of alkalies by the mouth. A rather limited experience leads me to believe that calcium, magnesium and perhaps potassium, are better bases for our alkaline treatment than sodium. But the second and more fundamental and effective measure is to promote a better metabolism of the fats by reducing the amount with which the organism is called upon to cope. In short, the food we administer should, if possible, be such as to be fully digested and oxidized with the least formation of acid products.

The fact that in some serious cases of gastrointestinal disturbance even breast milk is not satisfactorily oxidized, makes the problem of producing suitable artificial feedings for these infants a more difficult one. In the better types of private cases —such as I have related—provided they have not been too long neglected, and especially if there has been a gross error in the amount of fat in the food mixture, administration of alkalies to saponify the excessive fatty acids and the reduction of the fat will often suffice. In hospital and neglected cases of longer standing the powers of absorption are reduced, the condition is more persistent, and unless the continued use of a completely fat-free milk effects a cure and can be made to furnish a sufficient nourishment, we may find it advisable, as did Keller, to employ a malt-soup mixture in which the relatively low fat is compensated by an abundance of readily absorbable carbohydrates.

The conclusion is probably justified that the detection of a noticeably ammoniacal odor upon the diapers of an infant, especially if the diaper has been recently removed, and the phenomenon is repeated, points to a definite disturbance of metabolism. Furthermore, this ammoniacal odor may be regarded to some extent as an index of the disturbance, since it tends to disappear when the food has been adjusted so as to allow of more perfect metabolism. For the present, the fat of cow's milk seems to be the more frequent offender when given in excess of the normal capacity, or in cases of fat intolerance when given in excess of the individual's capacity.

More attention should be paid than has been paid in the past to the ammoniacal diaper as a clinical sign. The great desideratum in imparting to others the principles of infant feeding is to be able to point out definite indications for changes in the composition of the food. An odor of ammonia upon the diaper furnishes such indication, for it at once directs attention to a disturbance of metabolism, presumably traceable to an actual or relative over-feeding with the fat of cow's milk.

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BIBLIOGRAPHY.

Keller. Jahrb. f. Kinderhk., Vol. XLIV., Bd. 1897, s. 25.
Keller. Jahrb. f. Kinderhk., Vol. XLVII., Bd. 1898, s. 187.
Keller. Centralb. f. Alge., Path. u. Path. Anat., Vol. VIII., Bd. 1897, s. 947.
Keller. Malzsuppe U. S. W. G. Fischer, Jena, 1898.
Czerny and Keller. Jahrb. f. Kinderhk., Vol. XLV., Bd. 1897, s. 274.
Czerny and Keller. Das Kindes Ernahrung F. Deuticke Leip. u. Wien, 1901.

FLAGELLATE DYSENTERY IN CHILDREN.—In the children's hospital dispensary of Rio de Janeiro, Mello-Leitão has found, among 54 cases of dysentery, 32 cases in which flagellates were present. As soon as the flagellates disappeared from the motions improvement took place and disappearance of the cysts indicated recovery. The flagellates most commonly found in the stools are *Trichomonas intestinalis, Lamblia intestinalis* and Cercomonas hominis. This form of dysentery is most common at the end of summer and early autumn. The onset is, as a rule, gradual and preceded by diarrhea and fevers for a day. As soon as the stools contain blood and mucus, free flagellates will be found in abundance. The motions rarely exceed twenty a day and there is neither tenesmus nor vomiting. The disease lasts six to eight days and the prognosis is good. The diagnosis must be made by the microscopic examination of the stools. Magnesium sulphate is the drug, and water or milk the diet. Enemata of 1 per cent. collargol are sometimes useful. Trichomona and lamblia are only found in children under three years of age. (*British Journal of Children's Diseases,* February, 1913.)

THE INFLUENCE OF VARIATIONS OF DIET UPON GASTRIC MOTILITY IN INFANTS.*

BY MAYNARD LADD, M.D.,
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Radiographs of an infant's stomach, taken at regular intervals after a bismuth meal, offer a new and interesting method of studying gastric motility. By means of serial views, we may obtain exact data not only of the time required for complete emptying of the stomach, but of the rate at which the food is expelled. By varying the composition of the food, we may form an opinion of the effects of the different milk elements upon gastric motility. Moreover, if the same conditions of the experiment are maintained, we may determine differences in the effects of certain formulæ in several babies of approximately the same age.

In a paper which I read in February before the Tri-State Medical Association at Norfolk, Va., I gave the result of my observations of gastric motility based upon a study of 14 infants, making a series of 24 experiments, in which about 125 radiographs were taken. Since then, I have increased the number of observations by about 100; so that the ideas embodied in this paper are based upon approximately 225 radiographs of infants' stomachs, showing various stages of digestion. The object of these earlier studies was to determine the appearances of infants' stomachs during digestion so far as they could be demonstrated by the Roentgen ray, as we have as yet very little data by which to judge of normal and abnormal appearances by this method of investigation. There are so many factors upon which gastric digestion depends that it is a slow and laborious undertaking to gather sufficient data upon which to base conclusions. The age of the child, the quantity of food administered, the composition of the food, as shown by variations in the percentages of its elements, by alterations in its reaction, by addition of such ingredients as whey, barley water, etc., by the use of precipitated caseins instead of the natural proteins of milk—may all be factors influencing gastric motility. Then, again, there are the individual peculiarities of the child. It is very evident from the work I have already done that two infants of the same age, taking the same formula and quantity, may show very different gastric conditions as regards motility.

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* Read before the American Pediatric Society, Washington, D. C., May 5, 1913.

One of the first points observed in these radiographs is the curious lack of peristalsis to be seen in a normal infant's stomach, as compared with that of adults. The stomach appears to squeeze out its food by contracting as a whole upon its contents, seldom showing the marked indentations so characteristic of the peristaltic waves in the adult. In the normal case, some of the food appears in the small intestines as soon after the feeding as the plate can be taken. The emptying process goes on rapidly at first, the major part of the contents being expelled in from one and one-half to two and one-half hours, both in breast-fed and bottle-fed babies. After two hours the emptying process is very slow in the majority of cases, often requiring from four and one-half to five and one-half hours or even longer before all traces of bismuth have disappeared. In one case, a normal baby, there was a considerable residue of food after seven and one-half hours.

This condition of relative inactivity of the stomach as regards motility after the first two hours, appears to be due in part to the character of the food, in part to the lack of sufficient distention of the stomach, which seems to be a factor in stimulating peristalsis. If an infant is given a bismuth feeding and then at the end of three hours another feeding without bismuth is administered, the new feeding does not mix intimately with the bismuth residue of the earlier feeding, but appears to stimulate the contraction of the stomach as a whole, and the expulsion of the bismuth residue is accelerated, pushed out, as it were, by the new feeding. This expulsion is not immediate by any means, but is more rapid than if the stomach is allowed to empty itself without the stimulus to peristalsis which the new feeding imparts. On the other hand, one may show that if the new feeding is given so soon that the stomach has not had time to get rid of a large part of the first bismuth feeding, the overdistention which results produces a condition of inactivity or stasis and the emptying time of the stomach is prolonged.

This interesting action of the stomach is, I think, an important factor in explaining why the results of feeding infants at short intervals, such as two and two and one-half hours, may in some babies be successful, in others not. The normal emptying time, even in breast-fed infants taking the same quantity of food, varies within wide limits. In the case of Randolph, it was two and one-half hours; in Laffey, five and three-quarter hours; in Koar, five and one-quarter hours. An interval of two hours in the first case would find the stomach nearly empty of its contents and the new feeding, by exciting peristalsis, would hasten the exit of the residue that remained. In the other two babies a two-hour interval would find a large residue remaining from the previous feeding, so that the addition of a new feeding might readily overdistend the stomach and produce a condition of stasis, from which vomiting might easily result. I have not found, as yet, a child whose stomach was completely emptied in two hours. It is an exceptional case, even when it is emptied before three and one-half hours. If the peristaltic action is not stimulated by a new feeding, the emptying time is much more likely to range from four and one-half to five and one-half hours (or even longer), but, as we shall see, the character of the food is an important factor in determining the time required.

TABLE

Showing the Emptying-time (in hours) of the Stomach in Infants According to Variations in the Food Formulæ.

Formulæ.	Fat.	Lactose.	Protein.		Laffey, 7 mos., 5 ozs.	Randolph, 7 mos., 5 ozs.	Pearlmutter, 7 mos., 5 ozs.	Koar, 8 mos., 6 ozs.
No. 1. Breast milk....	(Composition unknown)				5¾			5¼
No. 2 Breast milk....	2.0	6.6	1.50			2½		
No. 3. Modified milk..	2.0	6.6	90-60			2½+	4½	3¾
No. 4. " " ..	4.0	6.6	90-60			4½	4½—	
No. 5. " " ..	0.0	6.6	90-60			4½+	3½	3½
No. 6. " " ..	0.0	6.6	3.50			7½+	4½	6+
No. 7. " " ..	2.0	6.6	3.50			6½+	4½	5¼+
No. 8. " " ..	0.0	1.5	3.50	(lactate of casein)			3½	——
No. 9. " " ..	0.0	6.6	3.50	(lactate of casein)			2¾	3¼+
No. 10. " " ..	2.0	6.6	3.50	(lactate of casein)				3½+
No. 11. " " ..	0.0	6.6	3.50	0.75 starch			3½	
No. 12. " " ..	2.5	6.6	1.50	0.75 starch			2½	5¼+
No. 13. " " ..	0.0	6.6	3.50	(precipitated casein) Bowditch		—	—	2½

The statement that the stomachs of breast-fed infants are emptied in two hours, and of bottle-fed infants in three hours, cannot in the light of these bismuth experiments be considered as even approximately exact. On the other hand, I think the advocates of four-hour feedings are mistaken in assuming that such an interval allows the stomach one hour of complete rest between feedings. In many cases, there is nearly as much residue after four as after three hours. This is particularly true if the formula contains high percentages of casein. The question of three or four hour intervals between feedings cannot be settled by *a priori* reasoning, but may well be left to one's experience with the individual child.

The objection may be raised that the bismuth alone may account for the apparent residue in these cases. I think this is disproven by careful observation. In the case of Randolph, a formula was given on two successive days (2.1 per cent. fat, 6.6 per cent. lactose, .90 whey proteins, .60 casein). On the second day the dose of bismuth was doubled without influencing the emptying time of the stomach, which for this particular formula was two and one-half hours. Again this same baby was given the same amount of bismuth in a formula calling for 0.0 per cent. fat, 6.6 per cent. lactose, 3.5 per cent. protein, and there was a considerable residue seven hours later. This specific instance, and many others, have convinced me that in a normal stomach the bismuth does not of itself retard peristalsis or in any way interfere with gastric motility. This statement is true of the subcarbonate of bismuth in doses up to two rounded teaspoonfuls. I have had no experience with larger amounts than this in infants. These large doses do not constipate the baby or cause indigestion. In my last series, eighteen rounded teaspoonfuls were given in the course of thirteen days without ill effect.

From my recent work on the effect of variations of fats and proteids upon gastric motility, the results of which, as far as I have been able to carry it, I shall give, two conclusions may be stated with confidence:—

First, there are individual variations in gastric motility independent of the composition of the food. Two infants, for example, showed an emptying-time, in one (Randolph) of two and one-half hours, in another (Koar) of five and one-half hours. The same infants, on a modified milk (2 per cent. fat, 6.6 per cent. lactose, .90 whey protein, .60 casein), showed an emptying-time of two and one-half hours, and three and three-quarter hours, respectively.

Second, in the same baby variations in the composition of the food have a decided effect upon gastric motility. For example, Randolph, whose stomach was emptied in two and one-half hours, when the food was 2 per cent. fat, 6.6 per cent. lactose, .90 whey protein, .60 casein, required six and one-half hours to dispose of the gastric contents when the proteins were changed to 3.5 per cent., the formula otherwise remaining the same.

As there are these individual variations, and as the composition of the food enters into the results, it is necessary, if one is to judge of the effect of diet on motility, to carry out a series of observations on one baby, repeating the experiments in other babies of about the same age and under approximately the same conditions. This I have done in the 3 cases—Randolph, Pearlmutter and Koar. The first and last were taking breast milk; the second was bottle-fed. All 3 were within one month of the same age (seven to eight months). Randolph and Pearlmutter took 5 ounces in the test meal, Koar, who was 3 or 4 pounds heavier, took 6 ounces. The amount of bismuth subcarbonate was the same in each test—2 rounded teaspoonfuls. In each case, the bismuth was given in 2 ounces of milk by a stomach tube and the remainder of the feeding given from the bottle. The first plate was always taken immediately after the end of the feeding, the remaining plates generally at one-hour intervals. The time was computed from the beginning of the feeding. When there was reason to think that the last plate over-ran slightly the period of complete emptying, the emptying time is expressed as so many hours *minus*. When the last plate showed practically an empty condition, slight traces only of bismuth remaining, the emptying time is expressed as so many hours *plus*. The infants were normal and well developed and free from digestive troubles.

The results of these observations may best be shown in tabular form. For various good reasons I could not carry out the full number of food tests in each case.

If these results are carefully studied, certain very striking facts are brought out. Whether they will hold in a larger series of cases, we must wait to see. First of all, in the case of the proteins, it is quite evident that the amount of casein, when it is in a coagulable form, is the most important factor in delaying the emptying time of the stomach. (I shall refer to the formulæ according to their numbers.)

In the case of Randolph, breast milk of known composition was emptied in two and one-half hours. A modified milk of the same composition, using a whey mixture with the amount of casein as estimated in the breast milk, was emptied in two and one-half hours plus. In Nos. 6 and 7, with a total protein of 3.5 per cent., the emptying time jumped to seven and one-half and six and one-half hours plus. The effect of fat is also shown in this series. Note that in No. 5, with no fat, the emptying time was prolonged to four and one-half hours plus. In No. 4, the 4 per cent. fat, it was four and one-half hours, but in No. 3 it would seem as if a moderate amount of fat, *i.e.,* 2 per cent., favored the expulsion, as the emptying time was only two and one-half hours plus. In Nos. 6 and 7 the same is true, *i.e.,* with 2 per cent. fat the emptying time was one hour shorter.

In the second case (Pearlmutter) no breast milk was available. The child had always been fed on strong modified milk with total proteins. This child seemed to have more casein toleration. As seen in Nos. 3, 4, 6 and 7, the emptying time was uniformly four and one-half hours, irrespective of the percentage of casein, or of the percentage of fat. An exception is seen in No. 5, when in the whey mixture without fat the emptying time was three and one-half hours, but the more rapid emptying time is undoubtedly due to the low percentage of casein.

In Nos. 8, 9, 11 and 12 I tried the effect of giving the casein in a modified form in the first two formulæ, using the precipitated casein, as it occurs in lactic acid milk; and in the last two using barley starch to make the curd in the stomach small and flocculent. In Nos. 8 and 9 the emptying time was from one to one and one-half hours shorter. In the case of the barley mixture, the results were even more striking. I do not, however, lay too much importance upon the apparent shortening of the time here, because the plates were not so definite that I could assert with positiveness that the bismuth was all in the intestines and not in the stomach. Unsatisfactory radiographs will now and then inevitably result, despite the best efforts of a conscientious Roentgenologist.

In the third case, Koar, who previous to these experiments had always had breast milk, one sees, as in the case of Randolph, a greater susceptibility to the action of casein. The emptying time on breast milk—of unknown composition—was as seen in No. 1, five and one-quarter hours. On No. 3 and 5, with a whey mixture of low casein percentage, the emptying time was three and three-quarter and three and one-half hours, or from one and one-half to one three-quarter hours less than when given breast milk. In No. 6, when the proteins were raised to 3.5

per cent., the emptying time rose to six hours plus—nearly one hour more than on breast milk, and nearly double the time required when the casein was .60 per cent.

Again in this case, as in Randolph, we see the marked reduction in the emptying time (Nos. 9 and 10). When the protein was given in the form of precipitated casein (lactic acid milk), being three and one-quarter and three and one-half hours only as compared with six hours when no effort was made to alter the curd. In No. 12, with barley starch, the emptying time was the same as on breast milk, that is, five and one-quarter hours. The most rapid emptying occurred when the mixture was made up from the dried precipitated casein prepared by Dr. Bowditch. In this case it required only two and one-half hours.

One does not draw definite conclusions from such a series of cases, but the suggestion is strong that the casein of cow's milk, when given in high percentages, has a decided action in prolonging the emptying time of the stomach. If this casein is precipitated outside the body, the emptying time is greatly accelerated. The presence of fat has no retarding action, and in some cases seems to favor the exit of the stomach contents. There is some reason to believe that barley starch renders the food more easy of exit.

In concluding I wish to express my thanks to Drs. Percy and Wyman, house physicians at the Children's Hospital, who have, by their interest and coöperation, relieved me of much routine work. And particularly I wish to thank Dr. Mulvaney, the assistant Roentgenologist, to whose credit entirely the radiographs are due.

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OSGOOD-SCHLATTER'S MALADY.—This condition is considered by Schlatter to have its pathogeny in the fact that, in the course of formation of the tuberosity from two bony processes, a "line of least resistance" develops that may be fractured, about the age of puberty, by a violent contraction of the quadriceps, or a slight traumatism. There is persistent pain localized in the tuberosity, and walking is difficult. Swelling and edema may occur; crepitation is not usual. Radiography is of assistance in diagnosis. Recovery is not always complete, but the treatment indicated is that of immobilization. (*La Presse Médicale,* February 1, 1913, p. 128.)

NOTE ON THE IMPORTANCE OF THE WASSERMANN REACTION FROM A PROGNOSTIC AS WELL AS A DIAGNOSTIC STANDPOINT.

BY WILLIAM PALMER LUCAS, M.D.
Boston, Mass.

The value of the Wassermann reaction as a diagnostic method of proving the presence of active syphilis is now acknowledged in every branch of medicine. By its use many obscure cases have been brought to light and proper treatment greatly facilitated. Most of the work done with the Wassermann reaction has dealt with the diagnostic value of the reaction. I have been struck with a further use of the Wassermann reaction, that is, of its prognostic value when the reaction is done on the serum of nursing mothers.

Maternal syphilis is very often without outward manifestation. Very often a baby who has suspicious signs of congenital lues is not considered as luetic because the mother shows no signs, and because of no history of lues. This often leads to a great error. Such suspicious cases should always have familial reactions done. That is, the parents' blood should be tested. It is, however, often difficult to manage this, especially, to obtain blood from the paternal side, and we are left to judge from the test of the maternal blood. Here arises the possibility of, I believe, a great error in diagnosis,—at least I have seen it work out so. As I have said, maternal syphilis very often shows no outward manifestation, whence it is concluded that the syphilis is a conceptional infection and not acquired by direct infection from the father. Accordingly, when hereditary syphilis is found in the child, the mothers are infected in an immense majority of cases, but their infection may be of a latent character, and so is often unrecognized. This form of conceptional latent syphilis explains the reason why Colles' and Baume's law was so long held to. That law, however, is now interpreted to mean that a child with inherited syphilis never infects its mother, because she is already infected.

Studies in maternal syphilis have brought out the fact that where the mother reacts positively to the Wassermann reaction, and where the child reacts positively to the Wassermann reaction, there is always active syphilis in the child.

A second group of cases is that in which the mother reacts negatively, having latent syphilis, and the child reacts negatively. These children very often show marked atrophy, malnutrition, decomposition, or whatever term the examiner wishes to apply.

They do not have active manifestations, but, nevertheless, they depend directly on the parental syphilitic infection. In these cases the paternal blood is always positive.

The third group is that in which the mother's blood reacts positively, and the child's negatively. In this group the child may show any of the parasyphilitic or late syphilitic manifestations.

The fourth group is that in which the mother is negative and the child positive. When the child reacts positively, syphilis is present in some active form.

A still further prognostic significance is found in the fact that where the mother's blood gives a strongly positive Wassermann reaction, the child giving a strongly positive Wassermann reaction, the outcome for the child is very much worse than where the mother is negative or the child is negative. Both being positive, the outcome is always very grave. In these cases, breast-feeding by the mother is about the only means of saving the child's life. Breast-feeding, therefore, becomes highly important, more so in these hereditary conditions than in almost any others.

During the past year out of a large series of mothers with congenital syphilitic babies whose blood was tested, we found that 70 per cent. of the mothers gave positive reactions of the blood, the infants having active syphilis. Of these, 44 per cent. died during their first year. These were seen at an average age of three months. None of them were entirely breast-fed. They had all had the breast for a few weeks, and then had been taken off, either completely or partially, because the breast was supposed not to agree with the infant. The 55 per cent. that lived, were first seen at an average age of two months, and all of them were either wholly or partially breast-fed and only one of these was not doing well under combined medicinal treatment and breast milk.

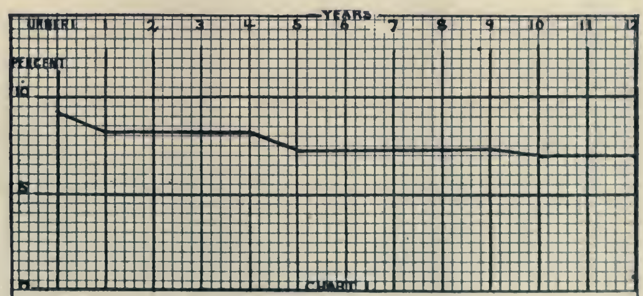
A syphilitic mother with a negative reaction, that is, a mother suffering with latent syphilis, may give birth to a child with a negative reaction, who may have no symptoms at any time except perhaps that indefinite symptom of nervousness. She may give birth to a child with parasyphilitic or late syphilitic manifestations, or she may give birth to a child with positive Wassermann reaction and active syphilis. The syphilis in these cases is usually not as active as in the cases where the mothers react positively, as well as the infants, and from this standpoint, I believe that the Wassermann reaction has considerable prognostic value.

THE AGE AND SEASONAL INCIDENCE OF DISEASES OF CHILDREN.*

BY CHARLES HERRMAN, M.D.,

Attending Pediatrist to the Lebanon Hospital and to the Beth David Hospital; Instructor in Pediatrics, Columbia University; Chief of the Department for Diseases of Children, Vanderbilt Clinic, New York.

The study of the age and seasonal incidence of diseases of children has something more than a statistical value; it may throw some light on many of the puzzling problems of etiology. The age incidence has been given some attention, but with very few exceptions little has been paid to the seasonal incidence. In 1900 Escherich published a short paper on "Studien über die Morbidität der Kinder in Verschiedenen Altersclassen" (*Jahrb. für Kinderhk.*, 1900, Bd. 51, p. 1), but gives only a summary without charts. He does not give the age or seasonal incidence of each disease, but divides childhood into a number of periods and gives the diseases more or less characteristic of each. In the paper he states that the detailed data will be published in another place. I have written to Professor Pfaundler, who was Escherich's chief assistant at the time the data was collected. In answer he states that as far as he knows this detailed data was never published. Still, in his "Commoner Disorders of Childhood," has given several charts showing the age and seasonal incidence in a few diseases.



CHILDREN UNDER 13 YEARS. NEW YORK CITY.
PERCENTAGE AT DIFFERENT AGES
CENSUS 1910

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* Read by title at the Annual Meeting of the American Pediatric Society, Hot Springs, Va., May, 1912.

In order that the charts shall represent the age and seasonal incidence of disease accurately, it is necessary that they should be based on a sufficiently large number of patients, at least 100 of each disease and the larger the number the more accurate are the results likely to be. It is not necessary that every single case should be included, for what we are primarily interested in is the *relative* proportion at different ages and different seasons. Most authors have given the absolute number of cases at each age and in each month. I have reduced the absolute numbers

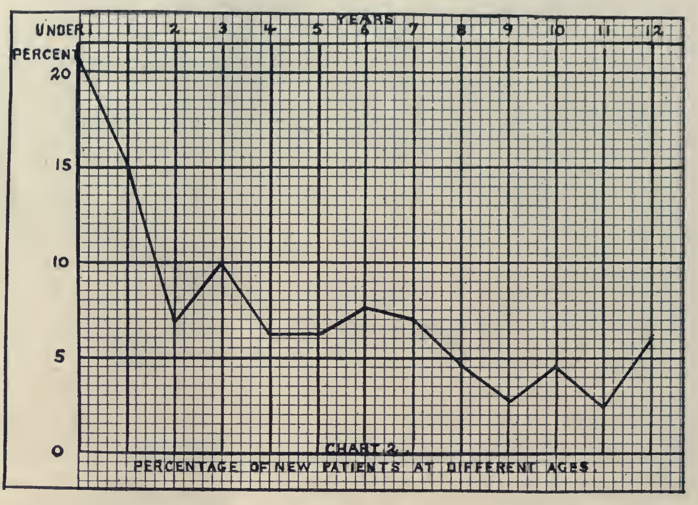

CHART 2.
PERCENTAGE OF NEW PATIENTS AT DIFFERENT AGES.

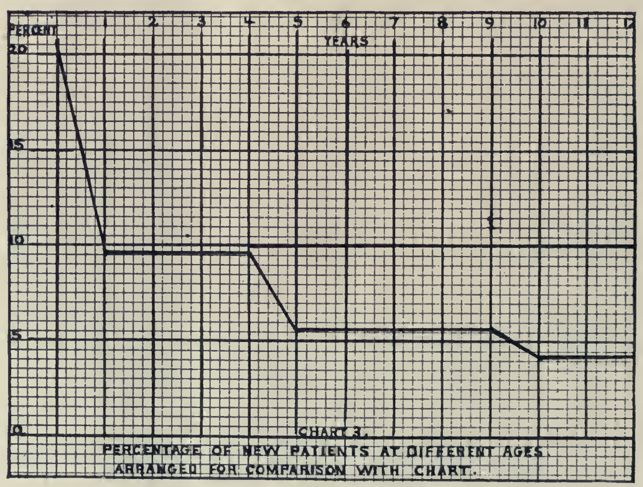

CHART 3.
PERCENTAGE OF NEW PATIENTS AT DIFFERENT AGES.
ARRANGED FOR COMPARISON WITH CHART.

to percentages because it renders the plotting of the charts simpler and it makes it much easier to compare the different charts on account of the uniform scale. In the charts showing the age incidence I have given the percentage of the total number at each age, and, in addition, the percentage of the total number coming for treatment at that age. It will be seen later that this is sometimes a matter of some importance. No diseases have been included in which the diagnosis is apt to be especially

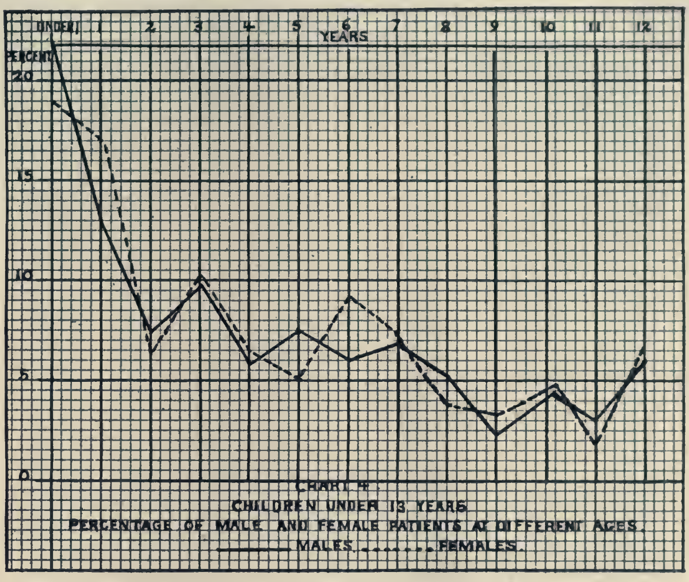

CHART 4.
CHILDREN UNDER 13 YEARS.
PERCENTAGE OF MALE AND FEMALE PATIENTS AT DIFFERENT AGES.
———— MALES ------- FEMALES.

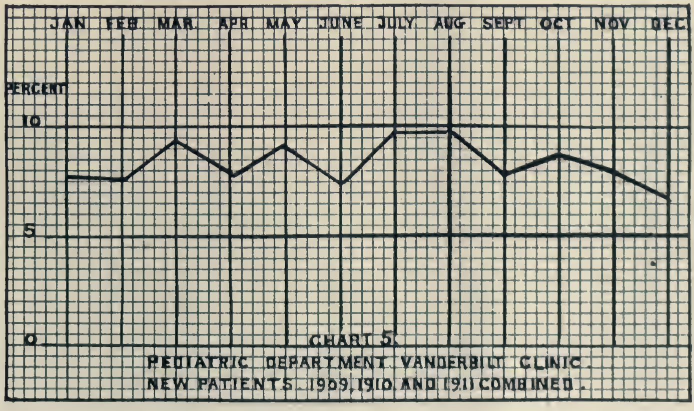

CHART 5.
PEDIATRIC DEPARTMENT VANDERBILT CLINIC.
NEW PATIENTS 1909, 1910, AND 1911 COMBINED.

difficult or uncertain, and all cases in which the diagnosis was doubtful have been omitted. Only a few diseases in which the age or seasonal incidence showed some noteworthy peculiarity have been chosen. In another paper I shall consider a few other diseases and also some conditions in which one or the other sex seems to be especially predisposed. The patients were those who presented themselves for treatment from 1906 to 1910 inclusive at the pediatric department of the Vanderbilt Clinic and the Lebanon Hospital dispensary, making a total of 32,000 new patients during these five years.

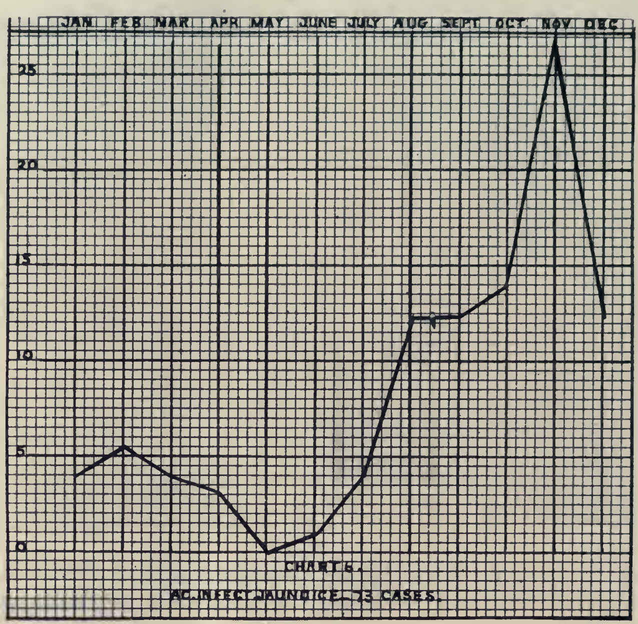

CHART 6.

AC. INFECT. JAUNDICE—73 CASES.

Chart 1. It will be noted that of the total number of children in New York City under thirteen years* 9.2 per cent. are under one year; there are 8.3 per cent. each at one, two, three and four years; 7.3 per cent. each at five, six, seven, eight and nine years; and 7 per cent. each at ten, eleven and twelve years. Comparing this with

Chart 2, the most striking difference is the high percentage during the first two years, the morbidity under one year being 20.6 per cent., and from one to two years 15.1 per cent. of the total.

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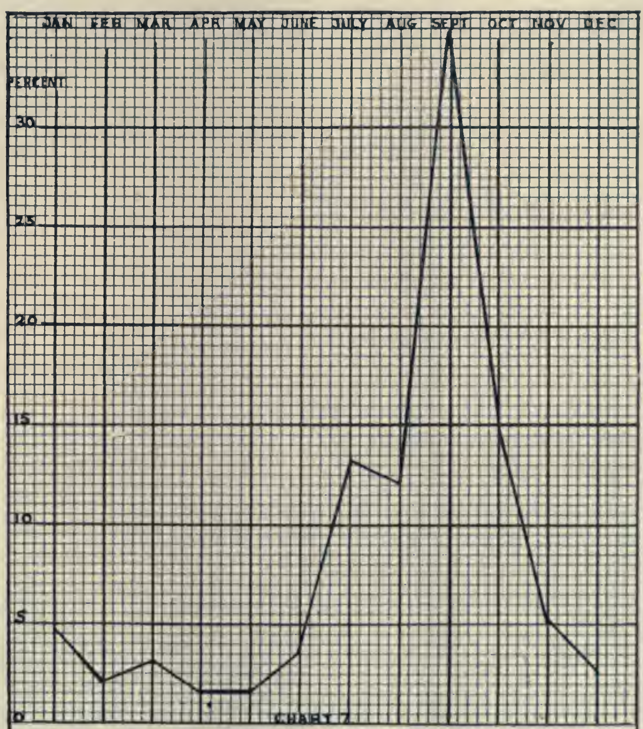
* I am indebted to Dr. Guilfoy, of the Department of Health, for these figures.

CHART 3 has been arranged for a better comparison with Chart 1. Comparing the two sets of percentages we find that

	POPULATION.	MORBIDITY.
Under 1 year	9.2 per cent.	20.6 per cent.
At 1, 2, 3, 4 years	8.3 " "	9.5 " "
At 5, 6, 7, 8, 9 "	7.3 " "	5.6 " "
At 10, 11, 12 "	7.0 " "	4.3 " "

The higher morbidity under one year is immediately apparent.

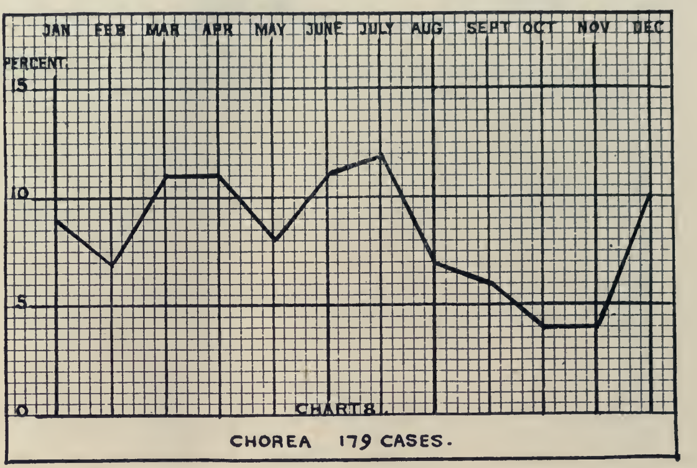


ANT. POLIOMYELITIS 198 CASES

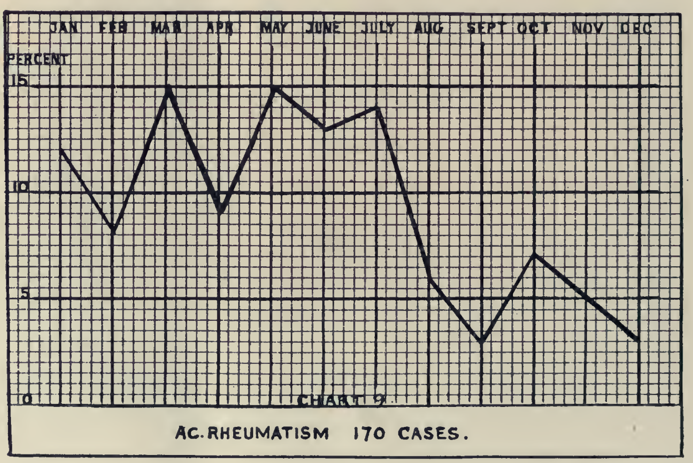
It is still distinctly above the average under five years and after that age it diminishes decidedly.

CHART 4 shows the relative percentages of male and female patients under thirteen years. It will be seen that the sexes are nearly equally divided. Of the total number 52 per cent. were male and 48 per cent. female. The sexes should therefore show an equal morbidity in each disease, and any marked discrepancy would indicate that one or the other sex is especially predisposed.

Chart 5 shows the relative number of new patients that came for treatment during the different months of the year. I have combined the three years—1909, 1910, 1911—because such a combination gives a more accurate idea than any one year, since the prevalence of some special disease might make a decided change in the curve for any single year. The slightly higher points in July and August are due in great part to the prevalence



CHOREA 179 CASES.



AC. RHEUMATISM 170 CASES.

of intestinal disorders, but it is noteworthy that this rise is becoming less and less marked, and this is undoubtedly due to the better understanding of the rules of infant feeding and hygiene. The total morbidity at different months is so nearly uniform that any marked rise in any one month may justly be ascribed to some peculiarity in the disease itself.

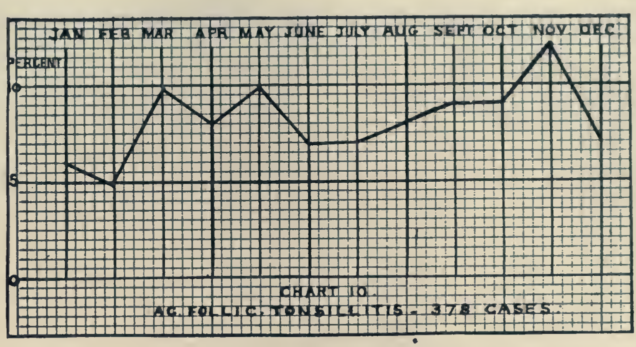
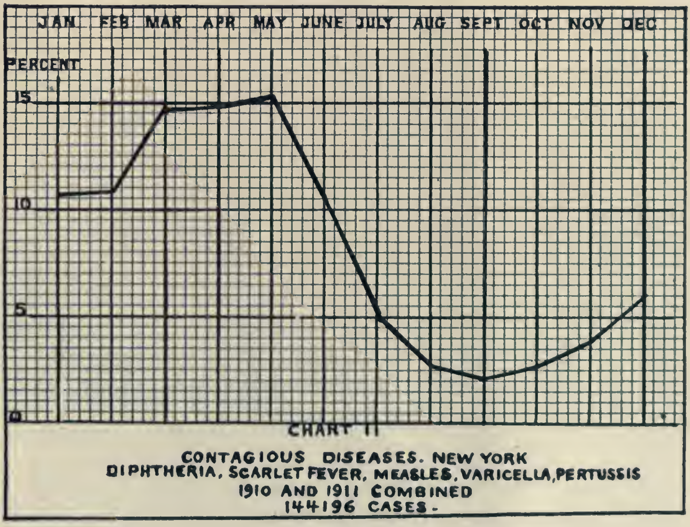


CHART 6. *Acute Infectious Jaundice.*—If any further proof were needed that this is an acute infectious disease the remarkable seasonal incidence would furnish it. We know of no non-infectious disease that shows such a uniform, marked rise at a certain time of the year. It seems strange that this disease should ever have been considered a simple gastroduodenitis. If indis-



cretions in diet played an important part it is difficult to understand why it is not equally prevalent throughout the year or possibly highest during the holiday season at the end of the year. As far as we know, there is no conclusive evidence that these patients have a gastritis. The vomiting which frequently ushers in the disease is probably toxic in the same sense as that which accompanies the onset of scarlet fever. The writer has seen a number of patients without gastric symptoms and many have a good appetite throughout the course of the disease. It seems much more probable that the disease is due to some infectious material which has a special affinity for the bile passages in the

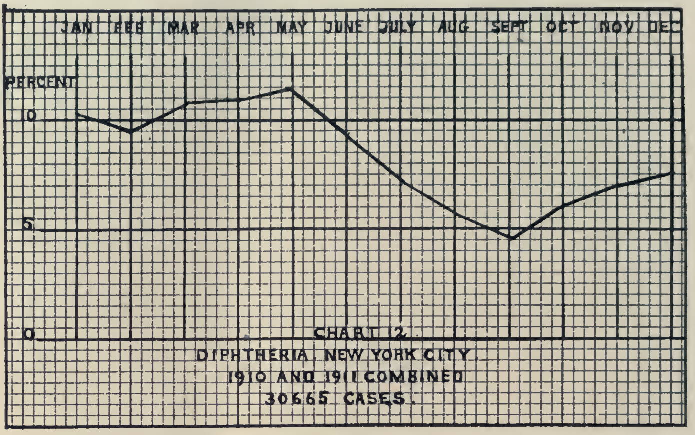


CHART 12.
DIPHTHERIA. NEW YORK CITY
1910 AND 1911 COMBINED
30665 CASES.

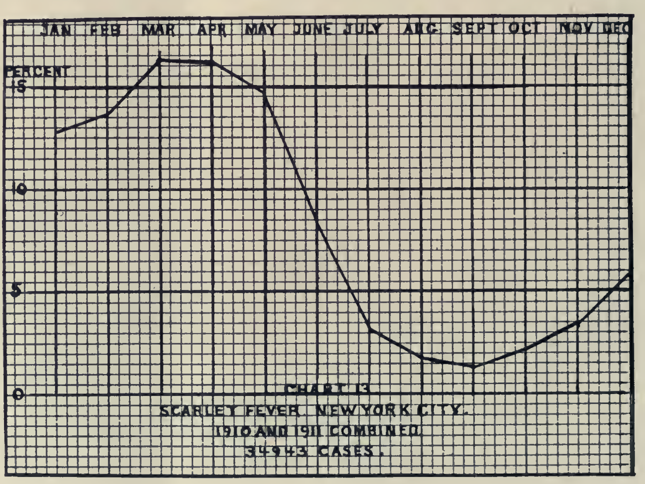


CHART 13.
SCARLET FEVER. NEW YORK CITY.
1910 AND 1911 COMBINED
34943 CASES.

same sense that the typhoid bacillus has a special predilection for the lymph follicles of the intestine. We have just passed through a small epidemic of acute infectious jaundice. During the last two months, from October 15 to December 15, 1912, the writer has seen 18 cases, one of which was fatal. This patient presented all the characteristic features of "Weil's disease"; all the other cases were of the usual milder type, with some rise of temperature at the beginning, later a distinctly enlarged liver, and in about one-half the cases a palpably enlarged spleen. Pain in the abdomen was a frequent symptom. Some years ago* the

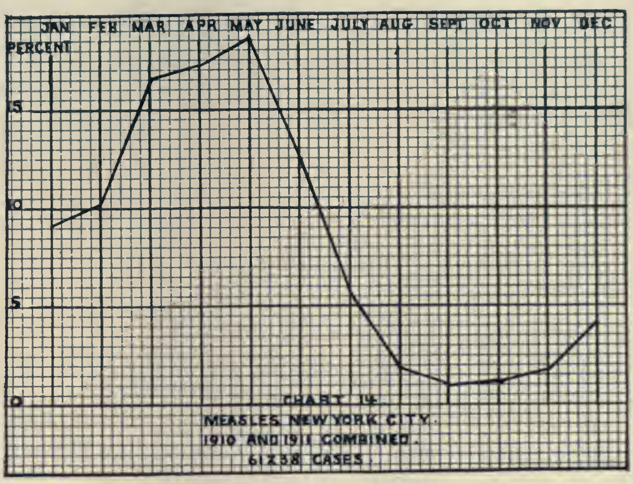


CHART 14.
MEASLES NEW YORK CITY.
1910 AND 1911 COMBINED.
61238 CASES.

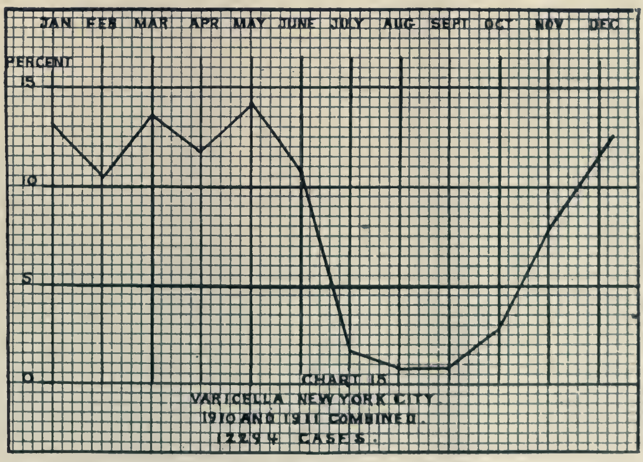


CHART 15.
VARICELLA NEW YORK CITY.
1910 AND 1911 COMBINED.
12294 CASES.

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* *New York Medical Journal*, September 22, 1906.

writer described a method of treatment for this condition which he has used with success since that time.

CHART 7. *Anterior Poliomyelitis.*—The marked prevalence of this disease in September is well known. Here again we have strong evidence of its infectious nature. The noteworthy fact is that this disease reaches its maximum at a time when the most common contagious diseases are at their lowest point. (See Chart 11.) The character of the infectious material, or its mode of transmission, must therefore be entirely different; its spread must depend upon some agent which is prevalent just at that time of the year. This would seem to lend support to the theory that the common stable fly acts as a carrier of the infectious material.

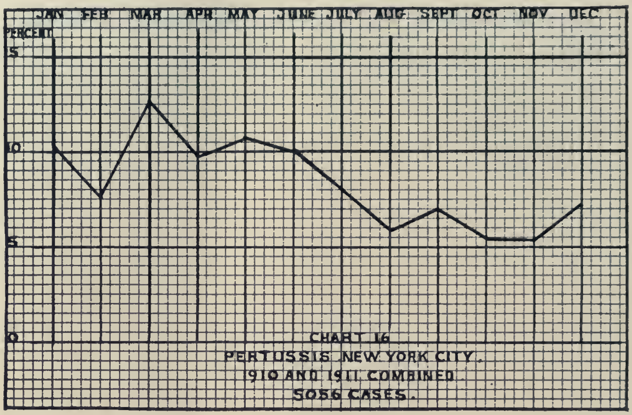

CHART 16
PERTUSSIS NEW YORK CITY.
1910 AND 1911 COMBINED
5056 CASES.

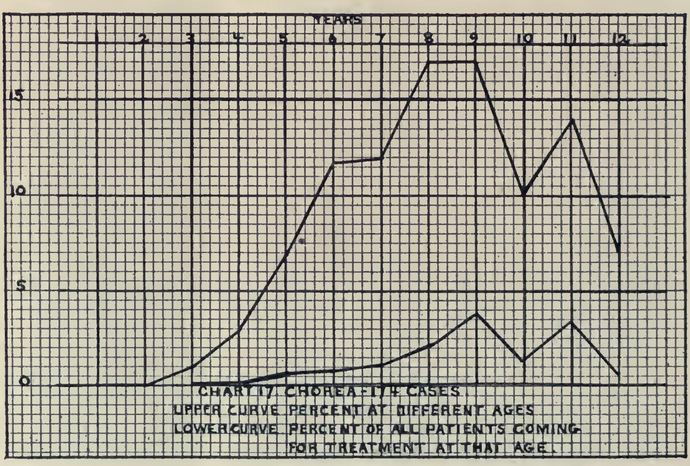

CHART 17. CHOREA - 174 CASES.
UPPER CURVE PERCENT AT DIFFERENT AGES
LOWER CURVE PERCENT OF ALL PATIENTS COMING FOR TREATMENT AT THAT AGE.

CHARTS 8 AND 9. *Chorea and Rheumatism.*—These two charts show a certain amount of resemblance and, together with those showing the age incidence (Charts 17 and 18), tend to emphasize the close relation between these two diseases. It is worth noting that the total number of patients presenting each of these diseases is approximately the same.

CHART 10. *Acute Follicular Tonsillitis.*—This chart also shows some parallelism with the two preceding, but as all these cases are probably not of the same etiology the resemblance is not striking.

CHARTS 11 TO 16. *Diphtheria, Scarlet Fever, Measles, Varicella, Pertussis.*—With the exception of pertussis, of which we have recorded 551 cases, the number of patients presenting these diseases has not been sufficient to plot reliable curves. I have therefore taken the figures of the Department of Health of New York City and have combined the two years—1910 and 1911—in order to correct slight discrepancies which are caused by taking a single year, as certain diseases, notably measles, are prevalent every other year. If more than two years are combined the character of the curve is not materially changed. The total number of cases of these five diseases combined is 144,196. It will be seen at a glance that these diseases reach their maximum during the spring, and fall very rapidly during the summer months. This cannot be explained entirely by the better ventilation and out-of-door life, for during the months of October, November

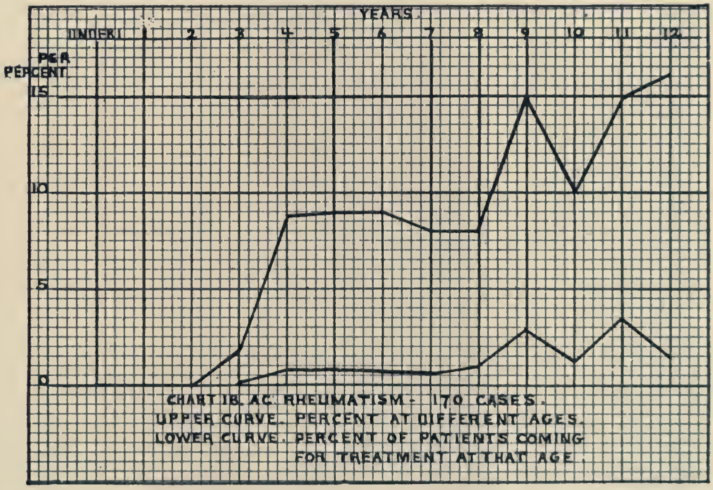

CHART 18. AC. RHEUMATISM - 170 CASES.
UPPER CURVE. PERCENT AT DIFFERENT AGES.
LOWER CURVE. PERCENT OF PATIENTS COMING FOR TREATMENT AT THAT AGE.

and December the total number is still small. Schools cannot play such an important part in the spread of these diseases, for they open before the middle of September, a month which shows the lowest percentage, and the percentage is still low in October, November and December.

CHARTS 17 AND 18. *Chorea and Rheumatism.*—In both of these charts it will be noted that no cases occurred in children under three years of age. Comparing the two no striking resemblance is apparent in the upper curves which represent the relative percentage at different ages. However, when we compare the two lower curves which represent the number of cases in proportion to the total number of patients coming for treatment at that age, the similarity is striking. This would furnish an additional proof of the close relation between these two diseases.

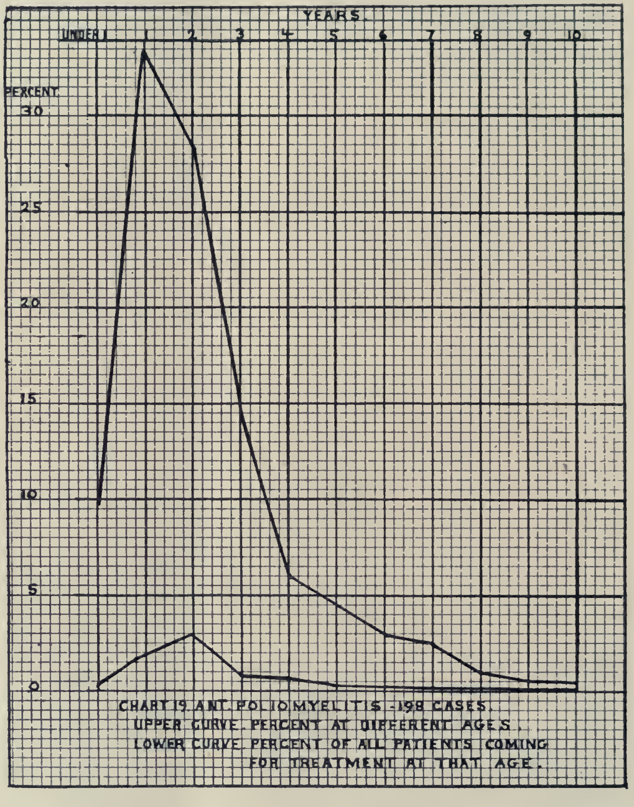

CHART 19. ANT. POLIOMYELITIS - 198 CASES.
UPPER CURVE. PERCENT AT DIFFERENT AGES.
LOWER CURVE. PERCENT OF ALL PATIENTS COMING FOR TREATMENT AT THAT AGE.

CHART 19. *Anterior Poliomyelitis.*—The marked prevalence of the disease in the second and third year is well known. In this series 71.5 per cent. of all the cases under ten years occurred in children under three years. However, although the relative percentages in the second and third year were 33.5 and 28.3 respectively, as the lower curve indicates compared with the total number of patients presenting themselves for treatment at these ages, there was a greater proportion during the third than during the second year.

250 West 88th Street.

TUBERCULOSIS IN CHILDHOOD.—Rohmer has recently given (*Münch. med. Woch.*, January 21, 1913) a chronological scheme of tuberculosis as it affects the infant and child, thus:—During the nursling period we may have a primary focus in the lung, with consecutive involvement of the bronchial lymph nodes and eventual caseation. There is no tendency at first to local or general extension, but a generalized tuberculosis may result from the caseous deposit within a year. From the second to the sixth year the meninges are most frequently involved secondarily, and there are more cases of tuberculous meningitis than of generalized tuberculosis. Osseous and glandular lesions are also common. During the same period acute miliary tuberculosis and acute caseous pneumonia are not uncommon. The school years —from six to fourteen, inclusive—are characterized by an extremely low tuberculosis morbidity and mortality. In other words, what the French term the period of "second childhood" (second dentition to puberty) is one of relative immunity to the disease. Roughly speaking, the caseous bronchial lymph nodes of the nursling represent the primary stage, and the numerous and varied manifestations up to the school years are the secondary manifestations. Then, after a latent period, we see first develop at puberty chronic pulmonary tuberculosis—a truly tertiary symptom, which becomes such a scourge to the race in its later years. (*Cf. Medical Record*, February 22, 1913, p. 345.)

SOME OBSERVATIONS ON INFANT FEEDING.*

BY HARRY RULISON, M.D.,
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The last five years have witnessed a remarkable change in the trend of our ideas concerning the substitute feeding of infants. Research in chemistry and metabolism has taught us that cow's milk cannot be converted into woman's milk and that there can be no single method of substitute feeding adapted to all cases. The teachings of those who have advocated percentage feeding have done much to advance the science of infant feeding, but their methods have not met with the success that might have been expected of them from a purely theoretical standpoint. They have met with their greatest success in hospital work and where laboratory feeding is possible. Aside from being based, as many of us believe, on an incorrect principle, the many mathematical calculations involved in their use have caused most physicians to resort to the routine use of one or another of the proprietary foods. The feeding of the average infant is by no means such a complicated process as much of the text-book teaching would have us believe. Finkelstein has commented on the surprising tolerance of the healthy infant for widely different foods. Minute fractional changes in the percentages of the various food elements from day to day is an unnecessary refinement.

The chief requisite for successful substitute feeding is a thorough knowledge of the underlying principles; the nutritional value of the food mixture as a whole and of each individual element entering into its composition; the nutritional requirement of the child to be fed, and the correct interpretation of the various signs of nutritional disturbances, together with the ability to refer them to the particular food element causing that disturbance. The failure to make such interpretations correctly is the chief cause of unsuccessful feeding.

While it leaves much for future research to clarify, Finkelstein's simple classification has been of the greatest practical value to most of us who have made its principles the basis for our feeding methods.

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* Read before Section on Diseases of Children, Medical Society New York State, April 29, 1913.

Although it is neither desirable nor possible to lay down hard and fast rules, it is necessary to have a broad, general plan to which to ground our feeding. In devising such a plan we must first consider what should constitute a proper substitute food mixture. As a whole, it should be of such a caloric value as to meet the demands of the individual child. Its component elements, moreover, must be present in such proportions as to constitute a well-balanced ration, within certain limits, which will depend largely on the metabolic status of the infant for whom it is intended. Its composition need not approximate breast milk nor necessarily resemble it closely. It should be flexible and capable of easy modification to meet changes in the infant's condition. Its preparation in the home should be possible.

A food which to my mind fulfils these conditions consists of dilutions of whole milk with water, to which is added from one to three carbohydrates, including at least one form of sugar. I do not mean to imply that all infants will thrive on such mixtures, but only that I believe it to be the best and simplest method of substitute feeding for the average infant.

In order to feed intelligently, one must necessarily have some standard by which the feeding is controlled. Both the percentage and the caloric methods have their advocates. I do not believe that we can afford to ignore either—both of them furnish us with valuable information. On the other hand, we should not allow either calories or percentage to hamper us in our feeding if the welfare of the child seems to demand more or less of a given food or any one of its component parts than would seem to be indicated by our standards.

The energy quotient of 100 calories per kilo of body weight diminishing to about 70 at the end of the first year has worked out well in my experience, although more children seem to require a food in excess of this than a weaker one; it would seem to depend largely on the class of cases one sees. The energy quotient for premature, under-nourished and atrophic children is much higher and it is often a problem whether to feed "for age" or "for weight."

The widely prevalent belief that the average bottle-fed infant is over-fed would be found to be fallacious were food values carefully calculated in every case. It is not at all infrequent to see a diagnosis of over-feeding made by the physician in the case of the child passing small, frequent, starvation stools and crying from hunger.

So much for the food as a whole. The proper proportions of its various constituents will be considered later.

The quantity of food to be given at a feeding and the length of the interval between feedings will depend on the age and development of the child. In general, I am in favor of larger quantities and longer intervals.

After the first two or three weeks of life the infant will usually take from 1 to 2 ounces more than the capacity of the stomach without any disturbance, provided that the interval between feedings is of sufficient length. The excellent work of Cowie and Lyon on the effect of gastric and duodenal reactions on pyloric opening and closure shows conclusively that different degrees of either acidity or alkalinity may hasten or delay the emptying of the stomach. Alkaline mixtures and mixtures containing high fats may be said in a general way to delay the passage of the food into the duodenum.

Cow's milk mixtures seldom leave the stomach of the normal infant in less than two and one-half to three hours, and I have found milk present in the stomachs of healthy babies five hours after a feeding during hot weather. Allowing for a rest then, it would seem that Grulee's contention, that it is never necessary to feed a normal infant oftener than once in four hours, ought to be about correct.

Long intervals, with plenty of water between feedings, where it has been desired, have given me much better results than the shorter periods. As to night feedings, I believe that their early elimination is desirable, but not always possible.

Food Elements.—Of the various elements entering into the composition of the food, proteid will be first considered. The casein of cow's milk was long considered the source of most of the gastrointestinal ills of infancy. The teachings of Biedert, which based the indigestibility of cow's milk casein on the presence of curds in the stool, was the basis of high fat—low proteid modifications. Hamburger advanced the foreign proteid theory to explain its supposed toxicity. There is abundance evidence, however, to substantiate the more recent teaching that under ordinary circumstances proteid gives rise to little trouble in infant feeding. Rubner, Orgler and others have shown that the N.

retention is quite as high in the case of the infant fed on cow's milk casein as it is in the child fed on homologous proteid. Howland states that proteid should furnish not less than 8 per cent. nor more than 10 per cent. of the total energy of the food, for he holds that quantities much in excess of these limits increase heat production unduly and throw an increased amount of work on the organism. Recent researches of Holt, Courtney and Wollstein prove that the infant will not be injured by high percentages of proteid, provided that a certain amount of whey salts be present, but that a rise of temperature ensues upon their withdrawal.

For the past two years I have been able to begin feeding with mixtures containing from 1.33 to 2.00 per cent. proteid, increasing to 3 or 4 per cent. at the end of the first year, with uniformly better results than formerly, when lower percentages were used. During that time I have not seen a casein curd and I believe they occur much more frequently when the fat exceeds the proteid than when it is equal or less. Moreover, colic has been a very infrequent symptom, and my experience has been that much of the so-called colic is hunger and the symptoms have disappeared promptly on increasing the strength of the formula.

I wish to state my belief that such measures as changing the casein-lactalbumin ratio, whey feeding and milk peptonization are seldom, if ever, necessary, and in this connection I wish to take issue with Cowie and Lyon in a statement made by them that little or no proteid is split in the stomach on account of the normal absence of free HCl. In a series of experiments, yet unpublished, I have found that the proteid in withdrawn stomach contents is completely dissolved upon incubation *in vitro* when no free HCl is present. As to whether it is split into its ultimate amino compounds I am as yet unprepared to say. Growth depends upon proteid and it cannot be eliminated from the diet without injury; if carbohydrates be withdrawn, acidosis results after a time, but, to a large extent, fat can be replaced, or compensated for, by isothermic quantities of carbohydrate.

The well-known tendency of the child to acidosis and its relation to recurrent vomiting should be borne in mind when high percentages of fat are fed. The subject of habitual vomiting is one that has been of much interest to me, and examination of the gastric contents in a series of cases apparently shows that in addition to hyperchlorhydria as a factor in these cases organic acids (lactic and butyric) are often present. Whether this is due to a hyperactivity of gastric lypolysis or of the gastric lipase or to retention is an open question. In all cases of habitual vomiting, including pylorospasm, low fats are indicated.

Carbohydrates.—The carbohydrates most commonly used in infant feeding are the disaccharids, lactose, maltose and saccharose, together with starch and dextrin. Of these, maltose is most assimilable and least liable to undergo fermentation, while lactose is much more easily fermentable. Just at present maltose is becoming widely used. Personally, in the feeding of normal infants, it has not given me results superior to those obtained in feeding cane sugar, although I believe it to be safer sugar to feed following convalescence from dyspepsia, acute intoxication and atrophy. The objections to its use are the laxative effect which it seems to have in certain cases, together with the fact that many infants seem to tire of it rather quickly and lose appetite. Cane sugar has invariably given me better results than lactose, and I believe in the past the use of the latter has been based on theoretical considerations rather than any real superiority in the results obtained. By means of the duodenal tube, Hess has demonstrated the presence of amylase during the early weeks of life, so we are no longer justified in believing that starch digestion is especially difficult in early infancy. Brady has called attention to the feeding of polycarbohydrates, and I have seen this method used very successfully in some of the German clinics. It should be borne in mind that the infant often develops an intolerance to one or another of the sugars, in which case another form of sugar should be substituted. During the course of a diarrhea sugar should be withdrawn, and it seems to me that even barley water would be better omitted during this period. Its supposed soothing action on the bowel is probably fictitious, as most of the starch has been split before it reaches the site of the disease and it simply supplies fermentable material. Weak tea or saccharin water is preferable.

Salts.—It is only recently that we have come to appreciate the many important rôles that the various inorganic salts play in the infant's metabolism. Time will not permit an adequate discussion of this subject. It must suffice to say that the whey-salt content of the food should be carefully watched. Probably many of the edemas occurring during infancy without renal or cardiac lesions depend on defective metabolism of sodium chlorid.

I have seen intense edemas with total suppression of urine disappear over night on placing the infant on a salt-free diet, and conversely an infant under treatment for marasmus gained 4 pounds in fourteen days without signs of edema upon a change from eiweissmilch to skim milk being made, a gain due principally to the increased water retention occasioned by supplying more whey salts. Whey feeding in such conditions as dyspepsia, acute intoxication, atrophy and spasmophilia is to be condemned. It yields only about 230 calories per liter, and its high salt content contraindicates its use. The routine use of lime-water in food mixtures is a bad practice. It should never be used without definite indications.

Fats.—In almost every text-book we see a chapter devoted to difficult feeding cases. Most of these infants refused to thrive on a mixture closely resembling human milk in composition. Now that we know more of fat metabolism in infancy and of the various disturbances dependent on the inability of some infants to digest and utilize fat properly, many of the hitherto difficult cases have become simple.

From a digestive standpoint, the infant is abundantly able to take care of fat. Ibrahim, Sedgwick and others have demonstrated the presence of a gastric lipase and more fat is probably in the stomach than was formerly believed. Hess has shown the pancreatic lipase to be present in normal amounts in acute intoxication and only slightly diminished in atrophy. Reasoning from the analogy of human milk, relatively high fat would seem to be indicated. In practice it is another story. Czerny has shown the relation of high fats to the exudative diathesis, and Finkelstein their influence on the elimination of calcium and magnesium, in the so-called balance disturbance and secondarily in atrophy. There can be no doubt that many infants cannot metabolize properly even moderate percentages of fat. Experience in feeding whole milk dilutions has taught me that the fat in a mixture will more often need reduction than increase after it exceeded 2 per cent. Many infants make phenomenal gains on buttermilk and skimmed milk without developing symptoms of rachitis or any apparent lessening of the immunity. In closing, I wish to say just a word concerning the proprietory infant foods. Much of the condemnation which this class of products has suffered in the past has been undeserved. Many of them, especially the malt preparations, are exceedingly valuable. They should not, however, be used in a hit or miss fashion. The physician should inform himself as to the composition of the food to be used, the caloric value of a given amount and the indications for the use precisely as would be done if a new drug were to be administered. The directions on the package are best ignored, as it is impossible to make them apply to more than a small percentage of children. If one has a thorough knowledge of what is now known concerning the underlying principles of infant feeding, rules and methods need no longer be laid down, for each case will suggest the method or the rule by which it should be governed.

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OSTEOGENESIS IMPERFECTA.—Although some British writers employ this term as a generic name, Schwarz and Bass (*American Journal of Diseases of Children,* 1913, No. 2, p. 131) apply it to a case of excessive fragility of the bones occurring in a child. In certain cases it appears to be familial, and Gurl believes it is transmitted to males through unaffected females. The bones may be of normal length or short, and soft or very brittle. The bone cortex is extremely thin, and the cranial bones are almost devoid of calcification. The base of the skull is ossified, but thin and friable. Most of the children are stillborn, and those that survive present a typical picture. They are small. with long silky hair, wide fontanels and sutures, and a head that has been compared to a parchment bag. The face is small, the nose and mouth well formed. The thorax and extremities show deformities due to union of multiple fractures. Drugs and organotherapy have proved useless. In regard to metabolism, Schwarz and Parker found that it was normal in respect of nitrogen, phosphorus, magnesium and sulphur. Calcium retention was a little below normal; sodium and potassium were both positive, but this is not helpful from the pathologic standpoint on account of the small number of analyses made in normal infants.

THE TREATMENT OF HERNIA IN INFANCY.*

BY J. P. HOGUET, M.D.,

Adjunct Attending Surgeon and Chief of Clinic, Bellevue Hospital; Chief of Clinic, Hospital for Ruptured and Crippled; Instructor in Surgery, Cornell University Medical College.

At the clinic of the Hospital for Ruptured and Crippled there are from 30 to 50 infants a week, all of them with a hernia of some kind. About 70 per cent. of these have inguinal hernias; of the remaining 30 per cent. the great majority have umbilical hernias.

Most of the inguinal hernias occur a short time after birth, generally within the first month of life and are most often seen in badly fed, under-weight babies. In premature infants they are very frequently seen. This, in all probability, is due to the poor musculature and the fact that it cannot withstand the strain of crying. The mother generally gives crying as a cause of the hernia, but constipation, whooping-cough and phimosis are also responsible for a number of them.

Generally speaking, the inguinal hernias in infants are small and easily reducible and are then more frequently double. They do not often enter into the scrotum and for that reason are very rarely strangulated. Strangulation, of course, can and does occur, but it is comparatively rare on account of the looseness of the pillars of the external ring, and practically always occurs in the larger scrotal hernias that have existed for a period of months. I have seen but two cases of strangulation in an infant in the past three years, in neither of which, on operation, was the intestine found to be greatly damaged.

Practically all of the infantile cases I have operated upon, or seen operated upon, have had hernias of the acquired type. Why this is so is hard to say. It has been my experience never to have operated upon an infant with a patent funicular process, whereas in children from four to fourteen an open process is found in about 1 case out of 6 or 8. A large hernia associated with an undescended or maldescended testis is very rare in infants.

As far as symptoms are concerned, where the hernia is small, they are very few. Possibly the mother will say that the baby cries more since he was ruptured, but this is not always the case. When the hernia is large, and when it is down in the scrotum, there can be no doubt but that it has a marked effect upon the babies' health. They have a good deal of pain, and on account of their crying the hernia practically never reduces itself, constantly remaining in the scrotum and increasing in size. In some cases there is considerable vomiting and a marked constipation. Many of these children, after they have had the hernia for a few weeks, show a decided loss of weight, take their food badly, and begin to take on the typical marantic appearance.

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* Read before the Washington Heights Medical Association, May 27, 1913.

When we come to the question of treatment we have to again divide these hernias into the large and small varieties. The small inguinal ones offer no difficulty at all. In the young infants, under one month, if the hernia be small a skein of ordinary yarn around the waist and then over the thigh on the affected side, with the knot over the inguinal canal, will generally suffice to hold the hernia back until the baby is old enough to wear a truss. In the babies over one month, a truss should be worn. It is surprising how well borne these are. If the spring be fairly light and the mother or nurse pays proper attention to keeping the parts dry and well powdered, a truss can be worn for years without the slightest abrasion of the skin. The spring of the truss may be covered with cotton and a small piece of some soft material may be placed between the skin and the pad, so that the truss can be applied fairly tightly and hold back a large hernia without irritating the skin. In many cases it may not even be necessary to keep the truss on at night, especially if the child sleeps quietly without crying. Of course, if the skin should become abraded, it may be necessary to take the truss off for a short while and then it may be wise to apply a skein of yarn.

These cases generally go on for a long time in this way. A really permanent cure by a truss is a great rarity; the hernia may decrease in size and the truss may even be left off without it reappearing, but sooner or later it practically always does reappear. If the hernia still persists when the child is three or four years old then an operation should be done. Of the young adults, from fifteen to thirty, operated upon by the author, almost 50 per cent. gave a history of their having had a hernia in childhood. But these small hernias are not the difficult ones to treat. Large scrotal hernias, sometimes as large as a hen's egg, are not at all uncommon in babies under two years of age. The hernia may be easily reducible and a well-fitting truss may be applied and yet it will be forced down behind the truss as soon as the child cries. In these cases, provided that the child is otherwise healthy, there is, in the writer's opinion, no contraindication to operation. The strain on the baby's health from a large intractable hernia is probably a much greater danger than that of the anesthetic, for there is no danger in the operation itself. The anesthesia need only be deep enough to keep the child from moving and when given in this way postoperative respiratory complications are very rare. The operation in uncomplicated cases should not take more than twenty minutes altogether, so that the strain of operation and anesthetic combined is not severe. Everything considered, ether is the safest anesthetic to use.

The operation done by the author in all his cases has been the regular Bassini, with or without transplantation of the cord, the whole proceeding being too familiar to need repetition here. There are a few points, however, that are worth mentioning. First of all, the incision must needs be a short one, generally not more than an inch and a half, but has to be quite deep, as many of these infants have a fairly thick layer of subcutaneous fat. The higher up it can be made the better, in order to avoid infection from the urine. The external ring is sometimes rather hard to find, but the sac, on account of its comparatively large size, is very easily found. The separation of the sac from the elements of the cord must be done very slowly and carefully on account of the small size of the vas. Once this is accomplished, the sac is ligated and cut away in the usual manner, the stump dropping back inside the abdomen. The deep sutures are placed exactly as in the adult, but on account of the short length of the canal it will be found that only a very few of them are needed, generally only two or three. In order to prevent recurrence, it is much wiser, in these cases, to put one deep suture above the cord so as to make a new internal ring, as this will be found to have been very much enlarged by the hernia.

The aponeurosis is sutured in the usual way and the skin is sutured with a few interrupted stitches of fine catgut, which come away of themselves and obviate the trouble of removing them—a not too easy task in a small infant.

The question of a suitable dressing after operation is one that is very difficult. It is obvious that the ordinary dry gauze dressing, as is used in the case of an adult, cannot be used on an infant in the diaper-wetting stage on account of soiling with urine. A light plaster spica is not of great protection either, as it will not keep the dressing absolutely dry. The various protective dressings, such as oiled silk or rubber tissue, have not been found to be of any great value. From practical experience in a number of these cases it has been found that the best results can be obtained from collodion dressings, which are put on as follows: A single layer of gauze about two inches wide and four inches long is saturated with collodion and laid over the wound. Over this other layers of gauze are placed and collodion painted over them until there is a fairly thick pad of gauze and collodion. This is allowed to dry and a large fluff of loose gauze is put over it and held in place by the diapers. The nurse or mother is instructed to watch the diapers very closely and they are to be removed as soon as they are found to be moist. If the loose fluff of gauze is wet it must also be changed. Primary union cannot be guaranteed even from this dressing, but it gives much better results than any other kind, especially when the incision has been made high up on the abdomen. If one of these wounds does get even very slightly infected, it takes a long time to heal, and in this case a wet alcohol dressing keeps it cleanest. Deep and extensive wound suppuration practically never occurs, the infection being limited to the wound edges.

As far as post-operative treatment goes, this is very simple. For the first few days after operation the temperature is apt to be high, 102°-103° F. is not at all uncommon, and does not necessarily mean an infection. This is not always the case as, for instance, a baby of nine months that I operated upon on January 20, 1912, at Bellevue Hospital, on the service of Dr. J. A. Hartwell, never had a temperature higher than 101°F. and that only for one day. This baby had an intractable hernia as large as a hen's egg and had primary union in his wound, which had been dressed with a collodion dressing. Real pain does not seem to be marked after operation, but the babies are always restless and irritable. If pain is present a small dose of paregoric can be given. Nausea and vomiting are hardly ever seen and the baby can be put to the breast or given the bottle as soon as the effects of the anesthetic have worn off. A postoperative cathartic is hardly ever necessary. At the end of the third or fourth day the child seems normal and, as far as its food is concerned, is treated as such. On the tenth day, if the wound be healed, the child can be allowed to leave the hospital if carried in arms. If old enough to walk the baby should be kept in bed for the full two weeks.

From the writer's experience with these cases he would, therefore, say that operation is always indicated in otherwise healthy babies that have a hernia that cannot be *perfectly* held in place by a truss—and the word perfectly is emphasized—that the operation itself is without danger and the anesthetic, if properly given, is of very little danger. All cases of strangulation or persistent incarceration must, of course, be operated upon as soon as possible.

Cases of undescended testis do not generally come under observation until the child is older, as a rule over three years, and cases in which an undescended testis is associated with a large hernia are very rare. All cases of undescended testis have patent funicular processes, but they are generally so small that they do not admit much through them, and for that reason give very little trouble. The only exception to this I have ever seen was the case of a young boy with a double undescended testis whom I operated upon a short time ago. He had a mass as large as a goose egg in the left groin and no testicle in the scrotum. On opening the sac at operation it was found to contain a large mass of omentum which was irreducible, and had to be tied off and resected. For the reason that large hernias are hardly ever associated with undescended testes it is best in these cases to wait until the child is five to eight years of age before operating.

The treatment of umbilical hernias in infants is comparatively simple. If treatment is begun early enough, that is, when the child is only a few months old, practically all of these cases can be cured by applying a small pad over the hernia and holding it in place with a piece of adhesive plaster, which is carried all the way around the body. The plaster has to be renewed every ten days or so, and it is very important that there be no interruption in the treatment. The pad and plaster generally has to be kept on for five to ten months before the child is cured. In children over two years this method of treatment should be given a trial for a few months and then if not successful operation is indicated. Either the ordinary suture by layers or the horizontal overlapping operations give very excellent results in children.

THE PUBLIC AND PROFESSIONAL CONFIDENCE IN CERTIFIED MILK AND THE BASIS FOR THIS CONFIDENCE.*

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Prior to the formation of the first Medical Milk Commission in 1892, under the auspices of the Practitioners' Club of Newark, N. J., Dr. Henry L. Coit had, for many years, been studying the problems involved. Until 1888, when his activities began, the production of pure milk as a sanitary and prophylactic science had been an absolutely unexplored and uncultivated field.

Strange as it may seem, even educated physicians had little knowledge of the importance of clean milk, and of the dangers from contaminated milk; or, if they did, the task of attempting to better conditions among dairymen, and to educate the public to demand a pure milk supply and to be willing to pay for it, seemed no doubt a hopeless one.

I think, therefore, I may state without fear of contradiction that to Dr. Coit belongs the whole credit of initiating this crusade, and to his almost apostolic zeal is due the remarkable success which the propaganda for pure milk has attained and is destined to attain.

While methods and standards for the production and distribution of "certified milk" have been elaborated to a high degree of perfection, it is remarkable to note that every fundamental principle was grasped and every important requirement provided for away back in 1892, when Dr. Coit, acting for his Essex County Medical Milk Commission, drew up his original code with Stephen Francisco, of Fairfield, the owner of the first certified milk dairy in the world. A year or two ago, while visiting the hospitals of Toronto, the writer spent some time in investigating the local milk conditions there. He learned that certified milk was produced in several dairies according to a law recently enacted there; and that when the committee having the proposed legislation in charge had studied the subject very thoroughly and intelligently, they had finally adopted as their basis Dr. Coit's code of 1892, without a single important change or modification, being unable to find anything of importance which he had not provided for.

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* Read at the Seventh Annual Conference of the American Association of Medical Milk Commissions, Minneapolis, Minn., June 20, 1913.

Following the lead of the original commission, similar organizations have been appointed, until now nearly 100 are in existence. Because of the urgent clinical aspects of the question which appealed strongly not only to physicians and health boards, but to the public as well, it has not been difficult to secure cooperation in an organized effort to reform. The necessity for clean milk in the feeding of infants and young children is now generally recognized, and laws have been enacted in many states which make it possible to improve conditions in cities and up-to-date municipalities when they are found to be inimical to health and safety. Health departments have been made to realize their duty toward the public in the matter, and the public has learned it has a right to expect certain things from the dairymen, and has begun to insist that these requirements be fulfilled.

In 1906 this federation, known as the American Association of Medical Milk Commissions, was formed with the purpose of extending the system, harmonizing and standardizing the requirements for certified milk. And while all of our commissions have not realized the importance of the work which they were organized to perform, and some have lapsed into indifference and carelessness, or have failed to become aggressive leaders in their communities, much good has nevertheless been accomplished by the example and precept of other commissions whose work has been more conscientious.

The personnel of each medical milk commission requires for successful work a number of men of such standing in the community that they will, *ipso facto,* command respect and attention, of mature judgment and experience, and with sufficient interest to devote their time and labor to the work without financial recompense.

The propaganda for pure milk is necessarily mainly an educational one. The public must be taught its importance. Such an undertaking takes time, and discouragements are bound to be encountered. At present we must close our eyes at times, and be satisfied to make progress slowly but surely; and while conditions even in the best managed dairies are not by any means ideal, they are certainly far in advance of a few years ago. Carping criticism should be condemned and every effort, no matter how feeble, should be encouraged and praised.

It has been claimed that the methods and standards which we have adopted are too high and that they are not practical. This is a mistaken idea. We must aim at perfection, and we should not be satisfied until it has been attained.

Many dairymen are operating their plants voluntarily in a manner to warrant the certification of their output. Oftentimes they hesitate to request medical supervision through mistaken impressions. Such men should be encouraged and their ambitions stimulated to produce a high grade of certified milk. When properly explained, no dairyman of ordinary intelligence need hesitate to comply with our standards. He must, of course, be a man of honor and of sufficient financial ability to provide proper dairy facilities and meet the other necessary expenses involved in the employment of experts for hygienic, biologic, veterinary and medical control of his plant. But if he is intelligent it will not be difficult to convince him that the increased revenue to be obtained from the sale of certified milk will amply repay him for the outlay.

The hygiene of the dairy which should be under the supervision and control of the veterinarian, if properly provided for at the start, involves comparatively slight subsequent expense. The tuberculin testing of the cows, and the removal, isolation and disposal of sick or emaciated animals from the herd, with proper recording and identification are matters of detail quite within the intellectual limits of the average dairyman, particularly if he knows a medical commission is going to check him up.

As to the bacteriologic requirements, the dairyman need have no fear, because it follows, as a matter of course, if his dairy hygiene is correct, if his cows are healthy, his milk cooled promptly and kept at low temperature, and the handling and transportation done in a clean manner, the bacterial count need not concern him, because it is bound to be low.

The bacteriologic and chemical examinations made by the experts employed by the medical commission should be thorough, but should be made in a manner just to all concerned, so as not to entail upon the dairyman unnecessary expense.

The medical examination of the employees and the supervision of their health and personal hygiene should be entrusted to some competent and conscientious physician, preferably one residing near the dairy, who will be paid for his services by the dairyman, but who will be responsible to the medical commission, and subject to its directions. He must be impressed with the importance of thoroughness in his work and he should impress upon the men at all times the importance of personal cleanliness.

The employees should be immunized against small-pox and typhoid fever, and every precaution taken to exclude typhoid and venereal disease carriers. Where a dairy employs its own microscopist it would be quite feasible to make its own Widal and Wassermann tests, and examinations of the stools of all new employees.

The superintendent should watch the men closely for evidences of carelessness; and cleanliness should be encouraged by the dairy management by providing ample bathing facilities, the use of which should be compulsory. There should be no economy in the use of soap and towels, and clean beds, in clean, well-ventilated dormitories provided for all employees.

The principles involved in this system of producing certified milk have been summed up by Dr. Coit under the three heads of Cleanliness, Caution and Control—Cleanliness as applied to everything and everybody; Caution as applied at every step in the collection, handling and transportation of milk; Control as exemplified in the contract supervision of methods of production from the first step to the final delivery of the product. To accomplish this the Medical Commission must assume leadership by taking the initial steps in selecting the highest grade of milk available for medical purposes; it must arouse the interest of the public and profession in pure milk; it must absolutely control the production of the grade of milk known as "Certified"; and, finally, it must teach the profession and the public how to handle and use clean milk to the best advantage in the protection and preservation of human life.

If the dairymen and Commission both do their duty, and the methods and standards of the Commission are honestly and intelligently carried out, a "certified milk" is produced which will be found of incalculable value in the treatment of dietetic and nutritional disorders of childhood, and a great factor in the reduction of infant mortality. Add to this the confidence and security of the public resulting from the sponsorship of physicians of prominence certifying to the purity of the milk, and we believe it will be readily conceded that the acquisition of "certified milk" constitutes one of the most important steps in the prophylactic hygiene of infancy and childhood.

As to the incompetent or careless Commission, I cannot express myself better than by quoting Dr. Henry L. Coit, in an address delivered by invitation before the Philadelphia Pediatric Society, May 18, 1912:—

"A Medical Milk Commission which fails to carry out any one or more of the essential parts of the system does not represent the system. The product which such Commissions permit to be called certified represents a serious menace to the certified milk system. Such certification establishes a false security in the minds of physicians and the public who have learned to trust the system and the name. Such certification savors of deception, and, as respects the milk itself, is a misbranding and falsification. The work of such Commissions is a detriment to the cause of certified milk, and reflects upon the reputation and diminishes the influence of the American Association of Medical Milk Commissions. A few such Commissions have, unfortunately, gained admission to our Association. No chain is stronger than its weakest link, and any Commission which weakens the strength of this national chain should not be tolerated as a factor in the government or legislation of the Association."

Under existing conditions ideals are of course impossible of attainment; so much depends upon the honesty of the dairyman, the intelligence of his employees, and the efficiency of the physicians on the various milk commissions. Let us aim high, and if we miss the mark let us not be discouraged by criticism or rancorous jealousy, but keep on trying. Our work should be always constructive, never destructive.

A NEW FORM OF OSTEOMUSCULAR DYSTROPHY ACCOMPANIED BY DWARFISM.—In *La Presse Médicale* for February 1, 1913, Tixier and Roederer describe some fresh cases of the dystrophy. The cases are characterized by a sort of combination of rickets and osteomalacia, by muscular weakness and by dwarfing. Various disorders of nutrition are also to be noted: in some cases there is wasting, and in others obesity and genital retardation. Genu valgum is frequent: and there is usually spinal curvature, either scoliotic or lordotic. The diaphyses are usually curved, and the epiphyses enlarged.

TENT-BASKET FOR OUTDOOR SLEEPING OF INFANTS.*

BY WALTER TRUSLOW, M.D.,
Brooklyn, N. Y.

All would probably agree that the more fresh air the infant may get, with proper protection, the better is the health. The conditions to be met, especially in city life, are safety from kidnapping, from falling missiles, from cats and dogs; protection from rain, from wind-drafts and the child's face from direct sunlight. In the cities, upstairs porches are very rare and the ground floor piazza (if present) is not sufficiently protective to the child.

The writer's tent-basket was designed to meet a particular need. It should be applicable to many needs. In the case in question, the home has a small front piazza with a gently sloping roof. On this roof a platform, 47 x 28 inches, has been built. The front end of this platform has a box-like receptacle in which have been placed a little earth and a few shrubs of privet. This carpentry work has been painted a dark green to match the color of the house. Between the shrub-box and the second story window is, therefore, a level space for the basket. If a piazza roof is not available, a simple platform, with strong bracket supports, may be built against the wall of the house just outside the window. Extension roofs are ideal.

The basket is an ordinary rectangular-shaped clothes basket, 34 x 20 x 15 inches, painted to match the color of the house. A local awning-maker has added a half-inch iron ridge pole and two iron uprights, fastened into the middle of the ends of the basket. Strong duck canvas lines the basket and strong canvas, green outside and white within, covers the top. This is tent-shaped and is so arranged that its flaps may be turned back in several directions, admitting air and light or protecting against wind and rain or direct sunlight. An ample supply of hooks and rings facilitates variety in combinations.

A rubber cloth is placed in the bottom of the basket, to keep out possible dampness, and an ordinary bed pillow acts as mattress. The child is placed in a Jaeger wool sleeping-bag, and other covering and a light-weight cap are added for very cold weather. The infant in question was born in August, 1912, and this winter sleeps in his tent-basket practically all day long, except in the stormiest weather. His parents have not yet the courage of their convictions to place him out at night. It seems needless to say that this child presents a healthy appetite, a constant even acceleration of growth and ruddy cheeks. He sleeps well and his parents think that the outdoor life has much to do with his happy, placid disposition.

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* Read at the Meeting of the Pediatric Section of the Medical Society of the County of Kings, January 22, 1913.

The cost of this outfit was:—

Platform, flower-box and painting	$6.00
Four privet plants	4.50
Clothes basket	2.10
Awning-maker's work and painting	3.50
Total	$16.10

This makes the entire cost, even with the platform, very low as compared with the elaborate sleeping-porch, which is so much advocated to-day.

It is obvious that the mother or caretaker is relieved of much labor and the use of much time, usually spent in pushing the needless baby carriage.

The device is presented as a simple, inexpensive and efficient means of insuring many hours of outdoor sleeping of infants and young children.

67 Hanson Place, Brooklyn, N. Y.

CONGENITAL FAMILY STEATORRHEA.—In the *Quarterly Journal of Medicine* for January, 1913, Garrod and Hurtley describe the strange case of a boy, aged eight, who has been subject from infancy to the passage from the bowel of liquid fat, which solidifies on cooling. He is the second of five children, whose parents are first cousins. The fifth child, now dead, was similarly affected. There are no other morbid manifestations and no indication of any disease. However much or little fat be taken, some 25 per cent. is thus lost in the stools, and it is supposed that he is the subject of a rare inborn error of fat absorption, "probably a Mendelian recessive characteristic," although so far investigation has not determined wherein the error lies.

THE SERUM TREATMENT OF EPIDEMIC CEREBROSPINAL MENINGITIS. REPORT OF CASES.*

BY HARRY A. ONG, M.D.,

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Epidemic cerebrospinal meningitis is an infectious disease caused by the meningococcus of Weichselbaum, characterized anatomically by an inflammation of the brain and spinal cord and clinically by an irregular course, a moderate febrile movement, with somewhat characteristic and profound nervous symptoms.

The disease is one of the most serious of the acute infections, the mortality before the introduction of the serum treatment varying from 25 per cent. in the mildest epidemics to about 75 to 90 per cent. in the more severe. It is more commonly a disease of childhood and youth, and up to a few years ago was viewed by clinicians all over the world with the greatest apprehension, for no therapy lessened its severity or reduced its fatality.

The first authentic report was of an epidemic occurring in Geneva in 1805, described by Vieusseau. Since this date the malady has been widespread. Severe epidemics have occurred in England, Germany, France, Holland, Canada and the United States. Asia and Africa have also been visited. It raged with great violence in nearly all the countries of Europe from 1814 to 1868. The disease first appeared in this country in 1806, when an epidemic occurred in the State of Massachusetts. It was especially severe in Philadelphia and the State of Pennsylvania generally from 1863 to 1865; in Maryland in 1892, and in Boston in 1897. The largest and most widespread epidemic occurred in New York in 1904 to 1905. An epidemic of moderate severity has but recently appeared in the States of Texas and Louisiana. America and Europe have suffered greatly from its inroads, and the United States has suffered quite severely from numerous epidemics which have been more or less scattered throughout the States. As Koplik puts it, "America seems to be the home of the disease, but it is difficult to account for this fact."

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* Read before the District of Columbia Medical Society, May 21, 1913.

From 1805 to 1905 the treatment was most unsatisfactory, merely empirical and symptomatic. Drugs were futile in limiting the severity or in any way modifying the course. Patients passed through the illness purely dependent upon their own resistance and nature was allowed to wrestle with the disease unaided. At times certain drugs were lauded, but it appeared that their good effects were due more to the avirulence of the infection and resistance of the host rather than to any specific action of the therapy. No measure seemed to have any effect; meeting with a degree of success in one epidemic, it would fail hopelessly in another. Hot baths relieved the restlessness; morphin, chloral and the bromides relieved the pain, hyperesthesia and headaches; but no measure seemed to exert any influence upon the exciting cause of the infection.

In 1891 Quincke introduced lumbar puncture. Hopes were raised only to fall again, for, although a procedure affording temporary relief and improvement, and in some cases even saving life, it failed to meet the demand for a specific. It opened, however, a new field for treatment, and various antiseptic solutions were injected into the spinal canal in an effort to destroy the invading organisms. A Portuguese suggested the injection of a weak solution of lysol subdurally. This was tried in this country as well as abroad, but after repeated failures was discontinued. Colloidal silver and cyanide of mercury were also used in the same manner, but with like results. Diphtheria antitoxin was even given a trial and was first used in Hartford, Conn. Selected and employed in an empirical manner it could only meet with failure, and Netter, the French authority, found the evidence incontrovertible against its use and efficacy.

Blood-letting, local depletion, purges, emetics, mercurialization, were all given a trial, but discontinued.

The situation seemed hopeless and clinicians everywhere awaited the discovery of a specific. Only a few years ago an editorial appeared in the *Journal of the American Medical Association*. "Little is to be hoped directly for treatment. There is no specific. The future may develop an antitoxin, but under the most favorable circumstances it is more liable to have a prophylactic than curative value."

In 1887 Weichselbaum discovered the exciting cause of the disease—the diplococcus intracellularis meningitidis. The organism fulfilled the requirements of specificity laid down by Koch, and in the pandemic occurring in Europe and America from 1904 to 1909 was proven beyond a doubt to be the real and only cause of the disease.

Practically from this date the search for an antiserum began. Workers in different parts of the world began their experiments independently of one another and by strange coincidence announced their results practically at the same time. Kolle and Wassermann, working in Germany, announced the result of their experiments and the production of an antiserum in 1906. In the same year Jochman, in France, announced that he was getting good results from a specific serum. These men all gave their serum subcutaneously at first, but later changed to the subdural route with much better results.

In 1904 to 1905 the great epidemic swept New York and the Board of Health of New York City appointed a commission to study the properties of the diplococcus toward the end of developing an antiserum. Flexner was on this commission. He set about his task with the idea that an experimental basis should be sought upon which the employment of an antiserum in man might ultimately come to be of value. He found that monkeys of the lower species could be infected with the diplococcus and an acute inflammation of the meninges result, corresponding pathologically, and in many instances symptomatically, with the disease in man. He reasoned that a serum modifying or curing the infection in monkeys ought to be of value in the treatment of the disease in man. The perplexing problems presenting themselves were solved one by one, and in 1906 he sent out his serum to the profession for a trial. It had been given subdurally to monkeys infected with the meningococci and favorably influenced the course of the disease. Would it be of value in the treatment of the infection in man if given in the same manner? With the answer which came back you are all more or less familiar. The average mortality was reduced from approximately 70 per cent. to about 30 per cent.; the course of the infection shortened; symptoms were lessened in severity; recovery hastened; and sequelæ prevented in a large percentage of cases.

Continued use of the serum since its introduction has substantiated these early reports. The serum greatly improves the mental condition, consciousness is cleared and patients often return from a comatose or delirious condition to a rational mental state within a few hours. Headaches are less distressing, and pain in the back and neck is greatly relieved. In the majority of cases there is a gradual amelioration of symptoms with the decline of the temperature by lysis. In about 30 per cent. of cases, however (mostly those in which the serum has been given early), the termination is by crisis—a sudden cessation in all symptoms and drop in temperature. The last signs to disappear are rigidity of the neck and Kernig's sign, and these may persist well into convalescence. Deafness seems to be the most common sequela.

Of course the most striking and positive indication of its efficacy is the reduction of the mortality. Before 1906 the lowest death rate in any one year was 58 to 80 per cent. At present the average mortality is about 30 per cent. The highest mortality occurs in infants and adults. Holt reported a mortality of approximately 100 per cent. in children under two years in the New York epidemic, and Flatten's figures, based on the Silesian epidemic, are practically the same. Flexner, reporting 712 cases in 1909, states that the mortality of children under two years in his series was reduced from 90 per cent. to 42.3 per cent., and in his latest report records 216 cases under two years of age with a mortality of 40.2 per cent. The mortality rate of adults over twenty in his 1909 report was 39.4 per cent. Recently he has published an analysis of 1,300 serum-treated cases, and in this series, which includes the cases in 1909, places the mortality of adults over twenty at 37.5 per cent., and the average mortality of all cases at 30.9 per cent. The mortality under five years and over twenty years is high. The most favorable age for the occurrence of the disease is from five to twenty years. It is difficult to explain the high mortality of adult cases. It may be due to the virulence of the infection or adults may not be so susceptible to the action of the serum.

Certainly no more brilliant achievement has been made in the advancement of serotherapy than the development of this serum, equalled only by the introduction of diphtheria antitoxin. Observers all over the world have used the serum and the results reported are more or less uniform.

Flexner's serum is bactericidal in its action, and must be brought into direct contact with the meningococci in the spinal canal and ventricles of the brain in order to be of value. All are now agreed that the serum should be given by lumbar puncture into the spinal canal. Kolle, Wassermann and Jochman at first used their serum subcutaneously, but later advocated its subdural injection with much better results. They knew little of its action and its employment was purely empirical. Flexner, however, knew the action of his serum, and its effect, and from the first advocated and directed its subdural injection.

The serum acts directly upon, and inhibits the growth of, or destroys outright, the meningococcus. It has the property of increasing phagocytosis and promoting intracellular digestion of the diplococcus and also possesses the power of neutralizing the soluble toxic products set free by disintegration of the meningococci. The action of the serum depends largely upon its degree of concentration.

Recent experiments have, however, revealed different strains of the organism, some of which are resistant to the action of the serum. The serum does not promote phagocytosis in cases infected with these strains—the meningococci remain free in the cerebrospinal fluid. These organisms are, therefore, called serum fast. In some cases the meningococcus develops or acquires a serum fastness, yielding to the action of the serum during the primary attack, but remaining uninfluenced during a relapse. Some strains are uninfluenced from the first. This property of serum fastness may, according to Flexner, account for these cases where the serum treatment seems to have little or no effect. It is to be hoped that later a serum will be developed which will favorably influence these forms and thereby reduce the mortality still lower.

The serum is difficult to standardize on account of its being bactericidal and antiendotoxic. The method used in standardizing an antitoxic serum is not applicable. Flexner determined its strength, however, by using its opsonins as an index of activity and Jobling has worked out this method. A suitable standard opsonic strength for such a serum is that in which a dilution of 5,000 times shows a degree of phagocytic activity exceeding that noted in the saline controls, viz., those to which no serum has been added. All the serum is standardized in this manner, so its strength as well as its action are assured.

Early injection is most important in every case in order to secure the best results, and lumbar puncture should be performed in every case of suspected meningitis in order that the nature of the infection may be definitely determined and proper treatment instituted. According to Flexner, in his last report, less than one-sixth of the cases analyzed (1,211) received the benefit of an early injection. He records the mortality of cases receiving serum from first to third day at 18.1 per cent.; from fourth to seventh day at 27.2 per cent., and later than the seventh day at 36.5 per cent. Surely this is a strong plea and argument for early diagnosis and treatment. If lumbar puncture is not performed early many cases will escape until too late for treatment.

Lumbar puncture, besides being of great diagnostic value, as well as serving for the introduction of serum, is also a valuable therapeutic measure in itself. It relieves excessive intracranial pressure, as well as removes toxic material and organisms from the spinal canal. In some cases it is a life-saving measure and should certainly be performed without hesitation in all cases where inflammation of the meninges is suggested or suspected. In this way only can epidemic cases be recognized early and patients be given the benefit of an early injection of serum. In other varieties of meningitis the simple withdrawal of the cerebrospinal fluid may cause marked improvement and ultimate recovery. The following case will serve as an illustration of the value of the procedure:—

Colored boy, age four. Admitted to the Children's Hospital. Taken suddenly sick in the morning with fever, convulsions and loss of consciousness. Was unconscious when admitted in the late afternoon, and on examination showed clinical signs and symptoms of meningitis. The temperature on admission was 99.6°F., but in a few hours rose to 104.4°F. Lumbar puncture was performed two and one-half hours after coming to hospital and 40 c.c. of clear fluid withdrawn under great pressure. The child regained consciousness during the night and the temperature had fallen to 100°F. on the following morning. The child made a rapid recovery and after being observed for a period of two weeks was discharged cured. Examination of the cerebrospinal fluid was negative for organisms. This case was probably one of Quincke serous meningitis.

Souther, in the *Lancet Clinic*, reports a case of a girl, aged six years, in which two lumbar punctures were made and purulent fluid obtained which showed meningococci on examination.

Serum was unobtainable, but the child's condition improved greatly after puncture and recovery was prompt. In this case the simple removal of cerebrospinal fluid, containing large numbers of organisms and toxic material, was sufficient to turn the tide and make possible her recovery.

In most cases of epidemic meningitis the cerebrospinal fluid withdrawn at puncture is turbid or cloudy and such a finding is positive indication for using the serum. Do not wait for bacteriologic examination of the cerebrospinal fluid, inject at once. If subsequent examination of the cerebrospinal fluid fails to reveal the meningococcus, further injections can be discontinued. All patients should be given the benefit of every doubt, and as Flexner's serum at the present time is the only serum of real value in any form of meningitis it should be used whenever the possibility of meningococcus infection is thought to exist.

During the first twenty-four to forty-eight hours the spinal fluid is often clear, and it is in these early cases that the best results are obtained from the serum treatment. Later, as mentioned, the fluid becomes turbid or cloudy. In those cases in which clinical evidence favors a diagnosis of the epidemic form of meningitis it is well to give the serum even though the cerebrospinal fluid is clear, discontinuing its use if bacteriologic examination of the fluid fails to show meningococci. Especially does this apply to such cases occurring during an epidemic of the disease. Bradley and Netter report cases which have been aborted by the early use of the serum.

The following case I desire to report in this connection:—

White, male, aged seven years. Admitted to Children's Hospital with signs of meningeal irritation. The history was that the child had been complaining of muscular pains and twitching of muscles of the face. Pain in head, restlessness, no loss of consciousness or convulsions. These symptoms followed shortly upon an attack of measles. The family and previous personal history were negative. The boy had always enjoyed good health.

The temperature on admission was 99°F., rising to 102°F. on the next day. The hydrocephalic cry was marked in this case, the pain in the head being severe. Kernig's and Babinski's signs were present and the picture presented was typical of severe meningitis. Lumbar puncture was performed the day after admission and 30 c.c. of clear watery fluid obtained under increased pressure. No marked change followed this procedure. On the following day, the hydrocephalic cry continuing, the temperature being moderately elevated and the child's condition apparently hopeless, another puncture was made and 3 c.c. of slightly turbid fluid withdrawn. Twenty-five c.c. of serum was injected. Following this injection the child's condition slowly improved. The temperature returned to normal, the hydrocephalic cry lessened and disappeared, and a complete recovery was made. The improvement was slow, but it was equally sure, and a case that at first was viewed as tuberculous with fatal prognosis left the hospital entirely well, and remained so. No diplococci were found on examination of the cerebrospinal fluid, so I cannot report the case as bacteriologically one of epidemic meningitis, but I ascribe this to a decided incomplete examination. One thing though is sure—the entire clinical picture changed for the better after the serum was administered.

As much cerebrospinal fluid as possible should be withdrawn at each puncture unless untoward symptoms arise. In this way large numbers of cocci are removed and a large amount of toxic material eliminated. Dilution of the serum is also prevented and the flow of serum to the brain is aided. Large quantities of fluid are sometimes withdrawn. Stevens reports a case in which 105 c.c. was drawn off at one puncture. In some cases only a small amount is obtained and dry taps are also made at times. Wesson reports a case occurring in the recent Texas epidemic in which dry taps were gotten six days in succession, yet serum was given each time and the baby recovered. Dry taps are, however, the exception and frequent trials should be made before being contented with a dry tap.

As to the amount of serum, no fixed rule can be laid down. As in the use of all sera the requirement of the individual case controls the dosage. Dunn advocates the giving of as much serum as will enter without undue resistance. At least 30 c.c. should be injected if possible. In some cases 40 c.c. or more may be given. In fulminating cases 30 to 40 c.c. should be administered, regardless of the amount of cerebrospinal fluid withdrawn, unless undue resistance is encountered or unless pressure symptoms arise. It may be necessary to repeat the injection of serum within twenty-four hours in these severe or fulminating cases. However, grave symptoms may follow too frequent injections and the needs of each case should be carefully considered before reinjecting. Over enthusiasm may be followed by collapse and death. Flexner, in a recent article, states that the risk of producing a dangerous increase in intracranial pressure from an injection is so small as to be negligible, especially if fluid is withdrawn first. He further states that even if an obstructive lesion exists and no fluid can be obtained on puncture it may still be safe to make an injection. The amount of fluid withdrawn bears no relation to the amount of serum injected, but, as a rule, the latter should be smaller.

The serum should always be warmed to body temperature and given either with a syringe or by gravity method. The gravity method has the advantage of preventing too great or too sudden increase in intracranial pressure.

The frequency of injection is dependent upon the course of the particular case under treatment. Dunn says to give the serum by daily injections on four successive days in an average case, or until the diplococci disappear from the cerebrospinal fluid. It seems, however, that by considering the temperature curve and general symptoms of the patient, a better idea is gotten as to how often to give the serum. Let the dose produce its maximum effect before reinjecting. If symptoms are increasing or remaining stationary another injection should be given without delay. Dochez has shown that the serum leaves the meninges and enters the general circulation in about twenty-four hours after injection, and in view of his experiments the twenty-four-hour interval was evidently selected. However, improvement often continues after the twenty-four hours have passed, and in these cases it seems inadvisable to continue daily injections.

Several cases treated at the Children's Hospital have recovered with a less number of injections, and these were not made daily. One case had puncture performed on day of admission; 3 ounces of cloudy fluid was removed and 30 c.c. of serum injected. Two days later another puncture was made; 1½ ounces of fluid was withdrawn and 30 c.c. of serum given. The case recovered. The temperature dropped to normal from 102.4°F. after first dose of serum and did not rise above 100°F. afterwards. Another case received two 40 c.c. injections. The first was given on day of admission and the second about forty-eight hours later. Good recovery. The case was one of moderate severity, the temperature ranging from 100° to 103.4° F. One case was admitted with temperature 102.8°F. Lumbar puncture was performed and 36 c.c. of clear fluid removed under very slight pressure—30 c.c. of serum was injected. The temperature promptly dropped to normal and child made good recovery without further administration of serum. This was probably an early case and was aborted by the serum. The meningococcus was found in all of these cases on examination of the cerebrospinal fluid.

These cases show that it is not always necessary to subject a patient to four daily injections of the serum, for there is always some danger connected with the injection of a foreign serum and of disturbing the normal pressure conditions within the central nervous system. On the other hand, daily injections should be made when the patient's condition remains stationary or fails to improve. By withholding the serum the chance of recovery is greatly reduced and if recovery does occur it may result only after a long and tedious illness and the chance for complications and sequelæ are greatly increased. One child, aged two years, admitted to the Children's Hospital with temperature 105.9° F., pulse 168, respiration 84. Brought to hospital in ambulance—no history obtainable. Examination showed signs of meningitis. Lumbar puncture was performed, cloudy fluid withdrawn, which contained meningococci on examination, and 30 c.c. of serum injected. Although the temperature ranged around 104° to 105° F., and the child's condition was unimproved, no serum was given for five days. The third injection was made five days later, the fourth three days later and the fifth after an interval of eleven days. During this time the temperature ran a high remittent course and only slight amelioration in the symptoms occurred. Posterior basic meningitis followed and convalescence was slow and tedious. This child was in the hospital about three months. Cases of this sort certainly should be treated more energetically and serum given daily.

The amount of serum necessary to effect a cure varies. Some cases reported have been given large quantities. Netter gave 823 c.c. in 22 injections with recovery. Hammond gave 405 c.c. in minimum doses of 30 c.c. and maximum doses of 60 c.c. to a girl aged twelve years. It is difficult to explain these resistant cases.

Suffice it to say that enough serum should be given until the cerebrospinal fluid is free from meningococci. Cultures should be made from the fluid before pronouncing a case cured. In this way only can relapses be prevented. When a relapse does occur it should be treated as the original attack, but as a rule it is more resistant to the action of the serum.

In some virulent infections it may be necessary to inject the serum directly into the ventricles of the brain or a combination of intraventricular and intraspinal route may be used. In infants this is a rather simple procedure, as the needle can be passed through the open anterior fontanel. Fisher reports a cure in an infant seven weeks old in which serum was given intraventricularly and intraspinally. He also reports a case where life was prolonged for thirty-seven days and the child was in desperate condition when treatment was begun. In older patients it may be justifiable to trephine and inject the serum, but results of this method as gleaned from the literature are not encouraging.

Flexner's serum is not limited in its application to inflammation of the meninges alone, but is of value in all cases of meningococcus infection. Ladd reports good results from aspiration of an infected joint and injection of the serum. These infected joints occur as a complication in many cases of epidemic meningitis. Concilman, Mallory and Wright report 6 cases of infected joints in 111 cases occurring during the Boston epidemic. Bovaird reports 1 case and Netter 1 case in which there was a general blood infection with meningococci without discernible local inflammation of the meninges or other organs attended by great mental excitement, in which intravenous injection of the serum was followed by recovery. The serum seems, therefore, indicated in those cases where the meningococcus is the invading organism and where this organism can be brought into direct contact with the serum.

Other than beneficial effects are sometimes produced by the injection of serum. Some of these are slight, others more serious. The slight transient effects are pain in the legs and lumbar region of six to twelve hours' duration. Rectal and vesical tenesmus may occur. In some cases a sharp elevation of temperature may be noticed, occasionally a rash with some fever is produced, but usually lasts only a short time. Collapse occasionally attends the injection from too sudden or too great increase in intracranial pressure. Death from this cause, however, is rare. Flexner, in a recent paper, states that the chance of producing dangerous increase in intracranial pressure is so small as to be negligible. The occurrence of collapse at the first puncture is also no indication that the accident will occur at subsequent ones. Levy states that cases showing alarming symptoms of collapse at the first puncture may bear subsequent ones well.

Williams and Fowler report a case of collapse after puncture from decrease in intracranial pressure; 45 c.c. of cerebrospinal fluid was withdrawn and no serum given.

Levy noted collapse in 16 out of 160 patients treated—2 of these failed to rally and of the others 5 died during the course of the disease. He thinks collapse more likely to occur in the more severe infections.

Robb, in the *British Medical Journal,* reporting 30 cases, states: "I have not so far seen symptoms which indicate undue pressure."

Dunn says a few of his cases have collapsed after puncture, but no deaths have occurred.

Certain effects, such as a rise in temperature and increase in the symptoms, may be produced by the sudden destruction of large numbers of diplococci by the serum and the liberation of endotoxins. It seems, however, that not much importance is attached to this action of the serum.

The severe symptoms of anaphylaxis, according to Flexner, can, it appears, be disregarded. There seems to be no danger from repeated injections. Sometimes urticaria is produced. Hutinel has had 2 cases and knows of 2 more in which serum was given thirty-five and forty-four days after first injection and serious nervous symptoms developed at once and proved fatal. The patients were three and six years of age, and 25 to 30 c.c. of serum was injected each time.

In closing, I desire to report 2 cases of anaphylaxis resulting from the use of the serum.*

Case I. White, female, aged four. Admitted to Children's Hospital with clinical signs and symptoms of epidemic meningitis. Lumbar puncture was made on day of admission and 30 c.c. of cloudy fluid withdrawn which contained meningococci on examination. 30 c.c. of Flexner's serum was injected. She stood the puncture well and the following day, in view of no improvement, another was made, 30 c.c. was withdrawn and the same amount of serum given. The temperature remained high, ranging around 105°F., and no improvement in the symptoms was noted. On the morning of the following day another puncture was performed, 9 c.c. of cloudy fluid was obtained, and, fearing the effects of pressure, only 15 c.c. of serum was given. The injection was made slowly and no undue resistance was encountered. Upon removal of the syringe from the needle no fluid backed out through the needle, showing that pressure in the canal was not increased. Shortly after the puncture was completed the pulse became rapid and feeble, the respirations rapid and labored, the face cyanotic, convulsive movements of the face and extremities were noticed, mostly on the left side, and the child went into a state of collapse. Morphin and stimulants were administered and the child gradually rallied and about an hour later turned her head slowly and made a slight sound on being spoken to, the first sign of returning consciousness which had been obtained. The temperature remaining high and the symptoms pointing to a severe infection, another puncture was decided upon in the afternoon. Only a few c.c. of fluid was obtained and 25 c.c. of Flexner's serum given. The child stood the puncture fairly well, but about five or ten minutes after operation was completed again collapsed and died in a few minutes.

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* My thanks are due Drs. Adams and Acker of the children's staff for their kindness in permitting me to treat and report these cases, which occurred in their service at the hospital.

CASE II. White, female, aged nine. Admitted to Children's Hospital with signs and symptoms of epidemic meningitis. Lumbar puncture on same day, 30 c.c. of cloudy fluid withdrawn, and same amount of serum given. Serum was injected without undue resistance and child stood puncture well. About 48 hours after the first puncture (the temperature continuing high, at one time reaching 106.8°F.) another puncture was performed. Only a slight amount of cloudy fluid was withdrawn and 23 c.c. of serum injected. No increase in intracranial pressure could be determined at the time. Fifteen minutes after puncture respirations became slow and in a half hour the child had passed into a state of collapse. Respirations ceased, face became cyanotic and pulse rapid and feeble. Under stimulation and artificial respiration the pulse improved, became slow and strong, the color returned, but the child made no attempt to breathe. The respiratory center was paralyzed. Artificial respiration was performed for several hours, during which time the pulse remained good, the color excellent, but no attempt was made to breathe.

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BIBLIOGRAPHY.

Flexner. International Clinic, 1909, 19 S., Vol. IV., pp. 1-21.

Flexner. Journal Experimental Medicine, May, 1913.

Flexner and Jobling. Journal American Medical Association, 1908, Vol. LI., pp. 269-271.

Flexner. Texas Medical News, Vol. XXI., 1911-1912, pp. 273-287.

Dunn (C. H.). *Ibid,* pp. 291-301.

Dunn (C. H.). Boston Medical and Surgical Journal, 1908, Vol. CLIX., pp. 743-748.

Radin (H. T.). American Journal of Obstetrics, 1911, Vol. LXIII., pp. 340-354.

Huinel. Jour. Med. Franc., Par. 1910, Vol. IV., pp. 384-399.

Hutinel. Presse Med. Par., 1910, Vol. XVIII., pp. 497-500.

Bovaird. Archives International Medicine, 1909, Vol. III., pp. 267-278.

Ladd. Journal American Medical Association, 1908, Vol. LI., pp. 1,315-1,318.

Netter. Bull. Acad. de Med., Par., 1909, 3 S., Vol. LXII., pp. 106-118.

Fisher. International Clinic, 1910, Vol. XX., S. II., pp. 147-152.

Fisher. Monthly Cyclopedia and Medical Bulletin, Philadelphia, 1910, Vol. III., pp. 129-138.

Downell. ARCHIVES OF PEDIATRICS, New York, 1911, Vol. XXIII., pp. 598-608.

Wesson. Bulletin El Paso County Medical Society, 1912, Vol. IV., pp. 19-33.

Souther. Lancet Clinic, 1912, Vol. CVIII., p. 130.

Chase. Ohio Medical Journal, Columbus, 1911, Vol. VII., pp. 21-25.

Robb. British Medical Journal, 1908, Vol. I., pp. 382-386.

TREATMENT OF ACUTE ABDOMINAL CASES IN CHILDREN.—J. P. Lockhart Mummery repeats the well-known surgical advice to operate as soon as any serious intra-abdominal lesion is diagnosed (*British Journal of Children's Diseases,* February, 1913). The common acute abdominal conditions in children are: (1) Intussusception; (2) acute appendicitis; (3) acute obstruction. Intussusception usually occurs in well-nourished children, is always very sudden in onset, and most generally can be diagnosed by the apple-jelly stools. The operation should be carried out forthwith and be carried through rapidly. Children should not, after operation, be kept on starvation diet, nor should they be restrained from moving about in bed. Mummery has not met with appendicitis under five years of age; it is, however, not so rare in infants as he believes. There is, in his opinion, nothing to justify delay in operation. "The important factors in performing the operation are: to be as rapid as possible, to handle the intestine very lightly, and to get the child back to bed as soon as possible." After operation he adopts the Fowler position, has a belief in the value of small doses of brandy (preferably by enema) and has found the hypodermic injection of pituitary extract most useful by causing peristalsis of the bowel and increasing the blood pressure.

CURRENT LITERATURE.

ABSTRACTS IN THIS NUMBER BY
DR. CHARLES E. FARR.
DR. JEROME S. LEOPOLD.
DR. WM. A. MURPHY.
DR. RICHARD M. SMITH.
DR. S. W. THURBER.

DISEASES OF EAR, NOSE AND THROAT.

WINSLOW, J. R.: REPORT OF A CASE OF BRONCHOSCOPY FOR MULTIPLE FOREIGN BODIES (ALMOND SHELL AND PULP) IN A CHILD TWO YEARS OF AGE, WITH SOME OBSERVATIONS UPON BRONCHOSCOPY IN INFANTS AND YOUNG CHILDREN. (*Annals of Otology, Rhinology and Laryngology,* March, 1913, p. 125.)

This little girl, while playing on the floor, suddenly became blue in the face and had difficulty in breathing. Her mother held her up by the feet, slapped her back and with the finger removed a large amount of almond shell and pulp from the child's throat. The resulting improvement in respiration made the mother think that all the nut had been removed. However, there have been several attacks of cyanosis and difficulty in breathing since then. Examination showed respirations 28, pulse 118, no fever, right lung normal, much shallower respiration over left lung, no râles and with slight retraction in left supraclavicular space. Nothing was seen by a direct laryngeal examination under cocain; a radiograph revealed nothing; the next day a low tracheotomy was performed in order to pass a bronchoscope and some milky pulp was removed from the left primary bronchus. The patient here became so cyanotic that further attempts had to be abandoned. Pneumonia developed the following day and went through a normal course of six days. During this time the tracheotomy tube was removed and the little patient allowed to breathe through natural passages. On the thirteenth day the child was discharged from the hospital with the wound nearly closed.

The subsequent history at home shows that she developed an influenza pneumonia during the next three weeks, during which time the tracheotomy wound opened and through which she coughed up an oval piece of nut kernel 6 x 3 mm., and ten days after this event she was reported as perfectly well.

The difficulties in this case were:—

(1) The child's age and under-development.

(2) The nature of the foreign body, a pulpified nut, pieces of which evidently entered several bronchioles.

(3) The bronchus involved, the left and most difficult to examine.

In these young children, upper bronchoscopy is very difficult, and where there is also a small sub-glottic space the passage of the instrument is very likely to cause swelling and prompt edema, when an emergency tracheotomy becomes necessary. The author appends a table of subglottic diameters in ages from eight months to ten years and the measurements range from 3.5 mm. to 9.5 mm. A very limited space to work through, so that a good rule in these small throats is to perform a tracheotomy first.

S. W. THURBER.

THEISEN, CLEMENT F.: PNEUMOCOCCUS INFECTIONS OF THE NOSE AND THROAT. (*Annals of Otology, Rhinology and Laryngology,* March, 1913, p. 175.)

The winter of 1912 in Albany was marked by a series of cases of septic sore throats similar to those reports from Boston and Baltimore. The following case in a child of seven months is characteristic:—

Child admitted to hospital with symptoms of a severe cold, with a profuse, stringy nasal discharge. The temperature was 102° F., and there soon developed great difficulty in breathing. The entire faucial region was extremely edematous and covered with the stringy mucus. A satisfactory view of the larynx was impossible because of the edema. Cultures showed pure pneumococci. The edema of the pharynx, and undoubtedly of the larynx, was treated by cold antiseptic sprays, and it very gradually subsided. The medication was 1 grain of urotropin for each ounce of fluid.

Four other cases, all in adults, had the same edema, and three of them exhibited a marked edema of the anterior surface of the epiglottis, which here occurred as a primary condition, contrary to the accepted theory. No pus was found in any of these cases.

S. W. THURBER.

SURGERY.

DOWD, C. N.: RESECTION OF ONE-THIRD OF THE COLON FOR IRREDUCIBLE INTUSSUSCEPTION IN AN INFANT FIVE DAYS OLD. (*Annals of Surgery,* May, 1913, p. 713.)

Dowd's case is absolutely unique in medical annals: A breast-fed infant, five days old, was taken suddenly with colic and vomiting and soon passed a bloody stool. The family physician, Dr. A. H. Martin, found a mass in the rectum and promptly made the diagnosis of intussusception and advised immediate operation. The parents delayed for twenty-four hours, and the child was seemingly moribund when the operation was at last undertaken. The intussusception was only partly reducible and over one-third of the colon had to be resected. The infant was in profound shock throughout the operation, but rallied and made a slow though uninterrupted recovery.

The literature shows but 8 successful cases of resection of intestine for intussusception in children under one year of age; only 3 of these were under six months and none under three months.

The five classical symptoms are: Sudden pain, vomiting, bloody mucus per rectum, mass per rectum and mass in the abdomen. Of these, blood per rectum is by far the most important and reliable sign. CHARLES E. FARR.

GREEN, S. F. ST. D.: SOME POINTS IN CONNECTION WITH APPENDICITIS IN CHILDREN. (*The Practitioner,* October, 1912.)

In about 31 per cent. of his cases of appendicits in children thread-worms were found, and in many cases there was a distinct ulceration of the mucous membrane at the site occupied by the thread-worms. In some they are found at the extreme end of the appendix buried in the mucous membrane folds.

The author advises immediate operation in acute cases seen within the first forty-eight hours. After the first forty-eight hours cases getting steadily worse, pulse rate increasing as well as area of pain and tenderness, tongue dry, foul and furred, also require immediate operation. This is also required if perforation takes place. If the symptoms and signs show that the disease is abating, pulse rate and temperature falling, the case should be carefully watched and surgical treatment may be delayed for two or three weeks. When an abscess has formed, immediate operation is necessary. WM. A. MURPHY.

GREEN, R. M.: TUBERCULOUS OSTEOMYELITIS OF DIGITS. (*Boston Medical and Surgical Journal,* May 29, 1913.)

Green considers spina ventosa, or tuberculous osteomyelitis of the digits, essentially a disease of infancy and childhood. The pathological picture is one of rarefaction of bone and chronic inflammatory reaction of the soft parts. The disease is self-limiting and spontaneous recovery is the rule, with more or less deformity, depending upon the amount of bone destroyed. In favorable cases resolution takes place, with absorption of the tuberculous focus, while in neglected or advanced cases pyogenic infection occurs, with sinus formation and sequestration. Treatment consists of local rest by fixation combined with general hygienic measures. Incision is rarely needed and amputation almost never. X-ray treatment may be of some assistance in hastening the final cure. CHARLES E. FARR.

MEDICINE.

MORSE, JOHN LOVETT: INTESTINAL TOXEMIA IN THE NEW-BORN. (*American Journal of Diseases of Children,* October, 1912, p. 229.)

The symptomatology of this condition is described as follows: A baby that was normal at birth and has continued to seem normal and to do well up to the second, third, fourth or even fifth day, becomes rather suddenly ill. He is likely to cry and moan considerably, although he is not infrequently unusually quiet. Attacks of cyanosis are a common and early symptom. Twitching of the extremities, slight general rigidity and retraction of the head come on in many instances, while convulsions are not infrequent. The temperature is, as a rule, only moderately raised, but may be high. In the more severe cases the baby refuses to nurse. Vomiting is uncommon. There is, in most instances, no diarrhea; in fact, the tendency is to constipation. In the majority of instances the symptoms develop before the baby has ceased to pass meconium, and it is very common to find that it has not passed as much as the average baby. If the stools are not composed of meconium they are usually small in amount, loose, dark-brown and contain small, soft curds and mucus. They are often offensive. The abdomen may be distended, but usually is not. Loss of weight is generally rapid, the face becomes pinched, and in all but the mildest cases it is evident that the baby is seriously ill. If the bowels are thoroughly cleaned out, all food stopped for a time and water given freely, recovery is usually rapid and complete. If the bowels are not cleaned out and food is continued a fatal termination is not uncommon and recovery is, in any event, slow. The author believes the etiology of this condition to be a bacterial infection of the meconium and that on account of the incomplete evacuation all the intestinal toxic productions are absorbed into the circulation. The treatment consists in catharsis, temporary withdrawal of food, giving plenty of water sweetened with saccharin, irrigation of the bowels, bromides or stimulants if necessary. Then resume feeding with breast milk if possible. If not, a mixture of cow's milk high in sugar in order to change the bacterial activity from the proteolytic to the fermentation type. RICHARD M. SMITH.

GUERRERO, M. S., AND GAVIERES, J. G.: THE ACTION OF THE MILK OF BERIBERIC WOMEN ON THE FROG'S HEART. (*Bulletin of the Manila Medical Society,* October, 1912.)

These experiments were carried out to determine a diagnostic method for use in doubtful cases of beriberi in nurslings. The following interesting conclusions were reached after 149 examinations of 75 samples of milk from (1) non-infected mothers with non-infected children, (2) non-infected mothers with infected children, (3) beriberic mother with beriberic child and (4) beriberic mother with non-beriberic child:—

First. Mother's milk paralyzes frog's heart quicker then Ringer's solution, the heart being immersed in the milk.

Second. In 80 per cent. of cases the heart survived longer than thirty minutes in the milk of non-infected mother and child.

Third. With milk of infected mother having infected child, 71 per cent. die within thirty minutes.

Fourth. The time of survival is longer if milk is obtained after a purgative is given mother, indicating the elimination of some of the toxin.

Fifth. It would seem that this offers a diagnostic method in doubtful cases. WM. A. MURPHY.

THERAPEUTICS.

JACK, W. R.: VACCINE THERAPY IN THE TREATMENT OF VULVOVAGINITIS. (*The Glasgow Medical Journal,* August, 1913, p. 84.)

Jack has not had very favorable results with the vaccine treatment of vulvovaginitis in children. In conclusion, he says: "The most that I should venture, personally, to urge for vaccine treatment is that it does appear to have a modifying effect upon the process, and that, although it cannot be relied upon to cure, it does comparatively rapidly reduce the discharge and with it the discomfort to such a degree that they become much more manageable."

Jack suggests deep medication of the external os and cervical canal with the female urethroscope as recommended by Rubin and Leopold. JEROME S. LEOPOLD.

INFANT FEEDING.

TOWLE, H. P., AND TALBOT, F. B.: INFANTILE ECZEMA AND INDIGESTION. (*American Journal of Diseases of Children,* October, 1912, p. 219.)

The authors report a preliminary investigation of the relationship between infantile eczema and indigestion. They divide eczema into two groups. One is the ordinary acute inflammatory form. The other a less intense inflammatory form. The first should be considered as a distinct pathologic condition. The second is much less definite in its differentiation. Examination of the stools shows that indigestion of fats and carbohydrates occurs with some degree of regularity associated with infantile eczema. The acute exudative type of eczema is most frequently associated with indigestion of fats and sugars and probably the indigestion has some etiologic relationship to the eczema. Many children show as marked indigestion as those with eczema and yet the skin remains normal. This would indicate that there is probably some general condition present in the eczematous child which bears an important relation to this condition.

RICHARD M. SMITH.

ARCHIVES OF PEDIATRICS

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EDITORIAL.

THE ETIOLOGY OF SUMMER DIARRHEA.

The work of the Boston Floating Hospital in its investigation of the cases of summer diarrhea under its care during the past four years is an evidence of what may be done when a not large number of cases are studied exhaustively as contrasted with the not less careful but less detailed work which must commonly be done when a large series of cases are studied from only the clinical standpoint. We have seen similarly, work, excellent and far-reaching, done at Ann Arbor, where, until recently at least, the available beds for children have been less than a score; and we feel sure that could such coöperation be secured in other cities between bacteriologist, pathologist, biological chemist, clinician and nurse as has obtained at the Floating Hospital, the problem of the etiology of summer diarrhea, affected as it seems to be by variations in locality, would speedily be brought to solution.

The Boston workers have done much to interpret *their own types* of enteritis and have elaborated methods of treatment which work, and which work consistently, with their pathological and bacteriological findings. Each year some one organism of the several commonly associated with diarrheas has seemed to predominate and to be associated with the larger proportion of the cases. For several years the organism predominating in August has apparently been the "key note" organism for the following year, predominating in the majority of cases occurring during that summer. This is a very interesting phenomenon, and if it is, as seems certain to the Boston pediatrists, an indication that the actual cause of the diarrheas are the bacteria which are isolated from the stools in these cases, would seem to explain why such contradictory results are obtained in different cities in the same years and why laboratories in different cities and countries are seldom in accord about this problem of the etiology of diarrheas.

For it was noticeable when Dr. Bowditch came to New York in October* and presented so attractively the work of the Floating Hospital to the New York pediatrists, that his experience did not fall into line with their experience and, although both were inclined to accept the bacteria in the stools as the causative factor, agreement was left for future work to determine. Likewise during the recent visit to this country of Dr. Ralph Vincent, of London, his paper, recording the results of his work in his excellently-equipped Infants' Hospital and suggesting a method for correlating stool findings with clinical data, was met with considerable skepticism in Boston, Philadelphia and New York—skepticism which was not due to lack of charity or open-mindedness, but to a lack of consonance between the experience of London and the American cities.

Since the researches of Booker, the corps of American pediatrists have taken kindly to the idea of an etiological association between the bacterial flora of the stools and the clinical symptoms of the diarrheas which produce them; and attempts have been made, perhaps most successfully as yet by the classification of the Harvard Medical School Department of Pediatrics, to supersede the earlier anatomical classification which sheds no light upon treatment.

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* See Society Report, p. 866.

Not so in Germany. There the ideas of Finkelstein and others have caused emphasis to be placed on the chemical constitution of the food and have neglected, so it seems to American minds, the bacterial element. And yet from some points of view the fact that certain bacteria are found growing in the stools is not a very impressive argument for their being the cause of the frequency of the stools, or their abnormal character, inasmuch as these bacteria may not have any relation to the physiological interior of the body, but as Dr. Freeman has suggested from his work with the Shiga and the Flexner bacilli may be present merely as a terminal event. So there is intellectual distrust to a certain degree here and abroad toward the work and findings of others.

To one viewing the problem somewhat from the side lines it seems manifest that both bacterial and chemical views cannot be wholly right or, rather, that probably *neither is wholly wrong*—that both may, perhaps, be reconciled.

We are coming to see that the manifestations of bacterial disease are in large measure dependent upon the ability of bacteria to appropriate to themselves the body proteids; that the actual symptoms are due in most cases to the interaction between specific ferments which the body cells elaborate in response to sensitization by the bacterial proteids, and the bacterial proteids themselves; that the differences in different diseases are due to the predominating localization of this sensitization, in the lungs as in pneumonia, in the intestines as in typhoid, the skin, in the exanthemata, etc., and not so much to any variation in the poisonous quality of the bacteria. For, with the exception of those bacteria which, like the Klebs-Loeffler bacillus and the tetanus bacillus, secrete an extracellular ferment or toxin, this poisonous principle seems to be practically identical in all bacteria, and, in fact, in all proteids. We know also that illness, fever and death may be caused by such bland substances as egg white and proteid obtained from oatmeal and may be caused by an overwhelmingly large parenteral introduction of bland proteids such as these even without the phenomena of sensitization being developed.

May not all diarrheas, so alike in clinical symptoms, have, as colds have, a common basis in the reaction of the cells of the intestine sensitized by bacterial proteid or the protein of milk, to a reinjection of that proteid through a permeable or injured epithelium—in short, may not the anaphylactic view of the cause of diarrhea be correct?

It has been observed that the quantitative sensitization to proteid varies in different organs with the same proteid and that with tissue from these organs more pronounced anaphylactic reactions may be obtained. Further, it is reasonable to suppose that the liberation of the anaphylactic poison *in vivo* will be more energetic at such a point and that its liberation will be accompanied by the formation of a greater amount of irritating products, either the poison itself or the cleavage products resulting from the destruction of body cells which it causes. If the site be the intestinal mucosa, diarrhea might reasonably be the result.

As such a mechanism might be common to many bacteria, to animal and to vegetable proteids, it would permit of a reconciliation between bacterial and chemical theories and would provide for the variation of degree of intensity of clinical symptoms and postmortem findings. The severity of proteid reactions varies in regard to the amount and time of dosage, the degree of simplicity of the proteid molecule causing it, the wideness of its distribution and the fineness of its division. These in turn are affected by the chemical constitution of the medium in which they exist, by its acidity and alkalinity, and by the freedom or difficulty they enjoy of coagulation or solution.

It seems to the writer that work along the line of determining the power of the blood serum of individuals ill with diarrhea to sensitize animals toward the bacteria which are held to be in etiological relationship to the illness from being found in the stools, should be done. Likewise work with proteids of food would throw light on whether the first division of the Harvard classification is correctly determined. Such work should be productive of much helpful information and perchance lead to a solution of our problem.

ORIGINAL COMMUNICATIONS.

ACUTE LYMPHATIC LEUKEMIA.*

BY FRANCIS HUBER, M.D.,
Professor of Clinical Medicine, Columbia University, New York.

Acute leukemia is not as infrequent as might be inferred from the relative scarcity of cases reported in medical literature. In view of the similarity of the prominent symptoms of this condition, to those present in several other not allied affections, the disease, in the absence of blood examinations, has been frequently overlooked.

The predominating evidence of hemorrhages from various mucous membranes has apparently justified the diagnosis of "morbus maculosis Werlhofii" or scorbutus. Thus Laache, of Christiana, points out that some cases which a few years ago have been called scurvy, are really acute leukemia with excessive pseudo-scorbutus stomatitis. Some of the reports labelled sporadic scurvy, in his opinion, ending fatally after a comparatively short course, are in reality undiagnosed acute leukemia.

Considerable interest centers in the condition of the gums. Henry Jackson (*Transactions of Association of North American Physicians,* 1911) reports 2 cases attributed, when the illness was first observed, to some local disturbance of the gums and mouth. In each case a rapid loss of strength followed the local trouble about a tooth. Case II. was admitted to his ward as one of possible scurvy.

It has also been confounded with hemorrhagic septicopyemia, with anemia or malignant diphtheria, in cases where ulcerative processes of the tonsils and pseudomembranes existed.

"Of special interest is the resemblance that some cases bear, particularly those without enlargement of the lymph nodes, to typhoid fever." Microscopic examinations of the blood and other organs are essential aids in determining the differential diagnosis. An examination of the blood should be made in every case of purpura. If this is done, the existence of leukemia can be definitely determined.

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* Read by title at the meeting of the American Pediatric Society, May, 1913.

August Strauch (*American Journal of Diseases of Children*, January, 1913), in his careful study of a case, has reviewed the literature up to the present. I am indebted to this most excellent article for many valuable points of interest in this paper, practically a resumé of his work.

The disease has been observed in a female infant with fatal termination nineteen days after birth, and, on the other hand, in a man seventy-three years old. The symptomatology varies with the more or less rapid progress of the disease. The course may be rapid, ranging from a few days to several weeks or, exceptionally, a few months.

The onset is frequently abrupt, less often insidious, preceded by lassitude, weakness, pain in neck or head, increasing pallor, shortness of breath, fever, etc.

In other cases, pains in the extremities or joints (simulating acute rheumatism), painful sensation in the splenic region and perhaps violent epistaxis or hematemesis, point to a blood dyscrasia. Not infrequently hemorrhagic necrotic ulcerative changes of the buccal mucous membrane, gums and tonsils or edema of the face are the first symptoms.

The appearance of hyperplasia of the lymphatic organs, the spleen, lymph nodes, the lymphoid structures of the oropharynx and other lymph adenoid tissues should arouse suspicion as to the nature of the trouble.

The most striking clinical manifestation, however, is the hemorrhagic diathesis, expressing itself by hemorrhages into the general integument, the subcutaneous tissues, and bleeding from the mucous membrane of the mouth and nose and the urogenital and gastrointestinal tracts. Hemorrhages into the brain, muscles, nerves, eye, ear, etc., have been reported.

Three principal types have been described by Gilbert and Weil, though the diverse pictures may overlap.

(1) The rare "typical" acute leukemia, with enlargement of the lymphatic apparatus as the predominant feature.

(2) The hemorrhagic form, characterized by an intense hemorrhagic diathesis.

(3) The buccopharyngeal, *i.e.*, the anginous and pseudoscorbutic form with hemorrhagic infiltration and necrotic ulcerative processes in the oropharyngeal cavity. The diagnostic symptom in these cases is the increase of the white blood corpuscles in the circulation, particularly the lymphocytes. In the begin-

ning, the changes may be only slight. The variation in the number of leukocytes may be considerable, ranging from several hundreds of thousands, or less than 100,000 to below 10,000 with even leukopenia. The principal and diagnostic characteristic of the blood in a case is the relative increase in the number of lymphocytes.

The polymorphonuclear neutrophiles constitute but a small percentage. In one of our cases but two were found in a count of 500 white blood cells.

As a rule, the macrocytic forms of lymphocytes are in excess. Under the influence of intercurrent diseases (pneumonia, sepsis, diphtheria, suppurative otitis) the blood may even become leukemic.

Cases of acute microlymphatic leukemia have been recorded in a number of instances. The existence of an acute myeloid leukemia in children has been established by a series of well-observed cases. Panton and Tidy (*Lancet,* 1912, No. 1, p. 1,328) have directed attention to the existence of acute myeloid leukemia. They bring evidence to show that there is no sharp line of demarcation between the lymphatic and the spleno-medullary type. Sometimes a patient, who has heretofore presented the characteristics of the latter, may toward the end offer a changed blood picture, and, if seen for the first time, might easily be regarded as a sufferer from the lymphatic form. Atypical cases are differentiated with difficulty, for in very young children a relative lymphocytosis exists.

In addition to the symptoms referred to above, the liver is enlarged, spleen likewise, and progressive emaciation and cachexia are noticeable.

The discussion of the therapy is brief. Atoxyl and salvarsan (tried also in Dr. Saxl's case) are of no avail. X-ray also has failed.

To quite Strauch: "Unfortunately, the words of Gilbert and Weil hold true, that the physician has done his utmost in making the diagnosis, since this involves, as it seems, *quod vitam* an absolutely bad prognosis." A rare curable form has been described by Turch. He is led to believe from a study of 4 cases which recovered, that a close genetic relation may exist between an acute infection originating in the tonsils and a "lympholeukemia reaction on acute infection."

In this connection it may be of interest to refer to a recent article by R. C. Cabot (*American Journal Medical Sciences*, March, 1913), who, discussing the lymphocytosis of infection, gives the following summary:—

"(1) Wound sepsis, boils and widespread streptococcic adenitis of tonsillar origin may be accompanied by a lymphocytosis so pronounced as to suggest lymphoid leukemia.

"(2) No reason is known for this substitution of lymphocytosis for the usual polynuclear leukocytosis of infections.

"(3) The distinction between such a lymphocytosis (accompanying a widespread adenitis) and leukemia depends upon the recognition of an infectious origin for the adenitis, upon the lesser degree of lymphocytosis in the infectious type, and upon the course of the disease."

But little is known in regard to the etiology of acute leukemia. It has been classed among the sarcomas. The majority of authorities refer the cause, particularly of the acute form, to infection.

In the 3 cases reported above, a badly ulcerated tooth and tonsillar abscess preceded the trouble in 1 case; in the second a badly crushed finger existed, and in the third multiple abscesses had occurred. Acute infection starting from the tonsils or adenoids is believed to have been the cause in a few patients who have recovered with lympholeukemic reaction of acute infection.

Pyogenic agents, as streptococci and staphylococci, appear to prevail in most of the cases. Spirochetes were found in the fluid obtained by aspiration from the lymph nodes. Animals inoculated by cultures from the blood of 2 patients who have died of acute myeloid leukemia have shown characteristic blood changes.

Positive results have been attained by inoculating a healthy dog with an emulsion of fresh bone marrow and spleen from a dog afflicted with acute myeloid leukemia.

Staphylococcus albus cultivated from leukemia in man has produced leukemia like blood pictures in 4 cases after inoculating dogs and monkeys. Other interesting animal experiments are referred to by Strauch.

CASE I. For the following history, and opportunity to see the patient, I am indebted to Dr. Josef Saxl. Male, aged fourteen years, born in New York of Russian Polish parents, lived under favorable sanitary and social conditions. He had the usual ailments of childhood. The past summer while at the seashore he developed a large number of abscesses over various parts of the body; these were operated upon and healed without trouble. In the latter part of September the boy was reported to be in fair condition, apparently well nourished, though somewhat jaundiced (?) and anemic. The yellowness disappeared in a week. When seen again October 31st at his own home in the city, he presented a high grade of anemia, was short of breath, had some nose bleeds, appetite lost, constipation present. The cervical and inguinal glands were enlarged, though not tender. Heart action rapid and irregular, pronounced myocardial weakness with loud murmurs over the precordial region. Spleen greatly enlarged, extending to the median line. Liver likewise considerably enlarged.

Blood examination:—

Red blood cells	2,000,000	
White blood cells	800,000	
Hemoglobin		40 per cent.

Dizzy spells, general weakness and tottering gait noted.

Under treatment there was some slight improvement. November 6th another severe hemorrhage occurred from the nose with vomiting of blood and sudden collapse. Pulse rate reached 200, thready in character. Rallied somewhat. November 9th there was a repetition of the above symptoms, the vomiting was distressing and persistent, necessitating rectal feeding.

Excessive weakness persisted. On the 16th another severe nose bleed occurred, from which he rallied somewhat, but the same night an internal hemorrhage with vomiting of blood caused a fatal outcome. Temperature was irregular in type, running between 98° and 103° F.

Blood examination November 9th:—

Red blood cells	1,500,000	
White blood cells	750,000	
Few nucleated red cells.		
Hemoglobin		30 per cent.
November 14th only		25 " "

500 white cells counted revealed:—

Small mononuclear	425
Large "	73
Polynuclear	2

No autopsy.

Case II. Harry S., four and three-quarter years of age, born in New York. Admitted to the children's service Beth Israel Hospital June 25, 1912. The family history was unimportant. With the exception of measles, preceded by chicken-pox in April, 1912, the patient had enjoyed fair health. About three weeks ago the right ring finger was caught in closing a door and bruised.

The present illness, as far as can be determined, was supposed to have begun a week later, when a paronychia formed about the contused finger. The distal and middle phalanx turned dark blue in color, became tender to the touch and increased in size, but remained quite soft. The nature of the dressing could not be ascertained. About this time chilly and feverish sensations were reported, accompanied at times by profuse sweating. Father noted that child coughed and expectorated thick greenish mucus. Seven days before admission marked swellings of the glands about the size of a fist, which have since decreased in size, appeared on either side of the neck.

In addition, patient became pale and dyspnea set in. Three days before admission the family physician called the attention of the parents to enlarged glands in both axillæ and inguinal regions. Ecchymotic spots were seen by the father on the right side of the back and right lower extremity, but he had not noticed any purpuric spots over the dorsal aspect of left upper extremity until his attention was called to them at the time the patient was examined at the hospital.

Patient was fairly developed, no edema or cyanosis present. Pallor of face and surface generally was pronounced, with a peculiar wax-like tint due to the marked anemia. In addition the skin felt cold and dry, numerous purpuric spots varying in size from one-sixteenth to one-eighth inch were found. A few large ecchymoses were detected over the buttocks.

Pupils equal and react. Both eyes prominent, left more so; in addition there is some subconjunctival hemorrhage on this side. The exophthalmus was marked and was explained by hemorrhages deep in the orbit.

Ears, nose and mastoid negative. Teeth in fair condition. Moderate hyperplasia of gums, some bleeding, mucous membrane pale. The axillary and inguinal nodes were moderately enlarged. Submaxillary gland was about the size of a walnut; post-cervical also involved; epitrochlear glands palpable. Heart and lungs negative.

Abdomen enlarged and distended. Liver dullness extends from about fourth interspace to line with the umbilicus. Spleen enlarged and hard, palpable as far down as level of umbilicus.

The injured finger was in a condition of dry gangrene (distal and middle phalanges involved). June 28th: Blood culture, Wassermann, nose and throat cultures negative.

	June 25th.	June 26th.	July 2d.
Red blood cells	1,400,000	1,400,000 Poikilocytosis.	1,160,000 Poikilocytosis.
White blood cells	30,000	31,200	8,600
Small mononuclear ...	37%	33%	5%
Large " ...	55%	60%	88%
Transitional		3%	1%
Polynuclear	6%	2%	4%
Eosinophiles	2%	2%	2%.
Hemoglobin	55%	55%	

Coagulation time less than eight minutes.

July 2d: The exophthalmus of the right eye has increased. Stool shows positive guaic (no meat given). July 4th: Severe hemorrhage from the oropharynx and alimentary canal, followed by collapse and fatal ending about the twenty-third day of the disease (as well as could be determined).

The temperature ranged between 101° and 98.8° F.; irregular in type. Pulse, 110 to 140.

CASE III. Morris F., school boy, aged nine years, native of Austria. Admitted to Gouverneur Hospital October 20, 1911, and transferred to Medical Service October 30th.

Family history unimportant. For years the boy has had trouble with his tonsils and has been a mouth breather. In June, after considerable suffering, a peritonsillar abscess was incised. There is also a history of "some swellings of both sides of the neck." A week later he developed diphtheria. Was taken to the Riverside Hospital, and four weeks ago was sent home. Since then he has constantly complained of pains about his heart and had frequent attacks of "apparent suffocation." In addition to this he had the same nasal trouble, but did not complain of his throat. He grew progressively worse, the attacks became more frequent and finally he was brought to Gouverneur Hospital. During the past week the boy has had a chill every forenoon, then felt feverish in the evening. The mother further states that for the past three weeks he has been constantly coughing and sweated a good deal at night. There has been considerable loss of weight since.

On admission, the patient was fairly well nourished, rather pale, with a herpetic eruption about the nose and lips. The buccal mucous membrane was markedly anemic with grayish-white flaky deposits on the mucosa. The gums showed considerable hyperplasia, presented a spongy and unhealthy appearance, bleeding easily when touched.

At the junction of the mucous surface of the lower lip on the right side and involving the alveolor mucosa, a greenish foul-smelling slough was noted, the right lower molar was extensively decayed, the adjoining gums were swollen, red and exquisitely tender. The submaxillary glands were enlarged, but did not show any fluctuation or tenderness.

Ears appear normal; at times there is a slight watery discharge from the nares. The tonsils are enlarged. Intense pain present in the throat and patient cannot chew or close his mouth because of the condition of his gums and molar tooth.

The posterior cervical, post auricular, axillary and inguinal glands were quite large. The glands in the submental triangle and at the angle of the jaw, particularly on the right side, were extensively involved, without any evidence of inflammatory reaction or matting together. The integument presented the waxy pallor characteristic of pronounced anemia, with an icteroid tint of hemolitic nature.

The apex beat was not visible; there was an indistinct diffuse fluttering impulse slightly below and within the left nipple. The heart sounds are slightly irregular, faint and indistinct; over the precordial area a soft blowing systolic murmur is transmitted to the left (probably of myocardial origin).

Pulse slightly irregular, compressible and at times almost imperceptible.

Chest.—On the left side, at the base posteriorly the physical signs are those of slowly resolving pneumonia. Spleen palpable, liver slightly enlarged. Temperature irregular, varying from 100° to 104° F. Nose and throat culture negative. Urine negative.

Blood:	Red blood cells	1,370,000	
	White blood cells	47,000	
	Hemoglobin	35	per cent.
Lymphoid marrow cells		42	“ “
Large lymphocytes		25	“ “
Small “		20	“ “
Polynuclear		3	“ “
Large mononuclear		6	“ “
Myelocytes		4	“ “

Since admission the boy has had several chills and complains of severe pains over the right side of face and jaw. Periods of depression, with difficulty of breathing and pericardial pains, restlessness and moaning are reported. At times there seemed to be a slight improvement in his condition. Though less complaints are made and the swelling of face has diminished, there is increasing weakness with more pallor.

October 31st, death occurred suddenly from hemorrhage, the blood pouring from his mouth. As an autopsy was refused, the seat of hemorrhage could not be determined.

As the principal characteristics of the disease have been brought out in the histories, but few comments are necessary. Attention may be directed to the very large proportion of white cells present in Dr. Saxl's case—800,000 white blood cells to 2,000,000 red blood cells; 750,000 white blood cells to 1,500,000 red blood cells—with only 2 polynuclears in a count of 500 white blood cells.

Case II. accentuates a point brought out by Osler and others —the importance of repeated blood examinations. In this case, while under observation, the cells varied from 31,200 to only 8,600. This is often seen in terminal infections.

A CASE OF BILATERAL HYDROURETER.—CHRONIC PYOCYANEUS INFECTION.*

From the Children's Service of Dr. Koplik, Mt. Sinai Hospital, New York.

BY HENRY HEIMAN, M.D.

N. B., a male child five years of age, born in the United States, was admitted to the children's ward during my summer service at Mt. Sinai Hospital on July 21, 1911, with the following history: Four months ago he suddenly became ill with fever, headache and vomiting. A few days later blood appeared in the urine and stools. Pain and tenderness in the right lumbar region developed soon thereafter. The patient has been in bed since the onset of the illness and has gradually become worse in spite of all medical treatment.

The family history is negative.

The patient was born at full term, was breast-fed for one year and then given adult diet. He has always been pale and delicate. For several years the patient has suffered from prolapse of the rectum and occasional appearance of blood in the feces.

Physical examination revealed nothing abnormal, with the exception of slight dullness in the left interscapular region and a few fine râles in the left axilla.

July 23d: von Pirquet reaction negative.

July 27th: General condition good. The temperature has been normal since admission. Deep tenderness in right upper abdomen. The urine contains many pus cells, but no red blood cells. No blood in the stools.

July 29th: Urine and stools show the presence of bacillus pyocyaneus.

August 4th: Blood culture negative.

August 5th:

Erythrocytes	3,600,000
Hemoglobin	47 per cent.
Index	0.7
Leukocytes	16,800

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* Read at the Annual Meeting of the American Pediatric Society, Washington, D. C., May 6, 1913.

Differential Count:	
Polynuclears	70 per cent.
Small lymphocytes	25 “ “
Large “	5 “ “

August 8th: Bladder catheterized and irrigated. The catheter was allowed to remain in place so as to observe whether the immediately succeeding urine is turbid. This was the case.

August 13, 1911:

	Blood count 1 hour before injection of pyocyaneus vaccine.	Blood count 1 hour after injection of pyocyaneus vaccine.
Leukocytes	9,000	9,600
Differential Count:		
Polynuclears	58 per cent.	51 per cent.
Small lymphocytes	35 “ “	43 “ “
Large “	3 “ “	3 “ “
Eosinophiles	4 “ “	3 “ “

August 16th: Cystoscopy and ureteral catheterization: Mouth of right ureter slit-shaped. Left ureter has rigid walls, is circular, golf-ball hole. Purulent urine is seen to come from the left ureter. The discharge from the right ureter cannot be seen clearly. Indigo-carmine injection negative on both sides for forty-five minutes. The bladder mucosa is normal, therefore the pyuria must be of supravesical origin.

Catheterization of ureters with No. 4 F. catheter: On right side obstruction met one inch from bladder; on left side, catheter passed two and one-half inches.

Specimens of urine obtained from each:—

URINE FROM LEFT URETER.	URINE FROM RIGHT URETER.
Urea, 0.2 per cent.	Clear.
Many pus cells.	
No tubercle bacilli.	
No growth on culture media.	

September 1st, 2d, 3d, 4th, 8th: Examination of urine shows no tubercle bacilli.

September 8th: General condition good. Temperature shows daily elevation to 99° or 100° F. Urine less purulent. The treatment consisted chiefly of autogenous vaccines, which were administered as follows:—

August	5th—	50,000,000
August	14th—	50,000,000
August	22d —	100,000,000
September	4th—	150,000,000
September	10th—	175,000,000

September 18th: Discharged apparently well.

Patient was readmitted to hospital on August 12, 1912, with the history that the urine had been cloudy for the last six months, but without hematuria. No pain on micturition. Patient has three or four watery movements each day, which at times contain mucus and blood. On physical examination, nothing abnormal was found.

August 19th: Urine contains many pus cells; bacteriologic examination shows the presence of bacillus pyocyaneus.

September 2d: No change in condition of urine.

September 24th: Much pus in urine.

October 1st: Examination of bladder made by Dr. Leo Buerger, to whose careful cystoscopic studies is due the first recognition of the condition of the ureters. The bladder showed a moderate degree of diffuse cystitis. What was more remarkable was the patulous condition of both ureteral orifices. The left orifice was enormously dilated, resembling the mouth of a small diverticulum. The right ureter was also enlarged, although it still retained some of the natural outline of a normal orifice. From these appearances the presumptive diagnosis of hydroureter and possibly also dilatation of the pelvis of both kidneys was made. He advised the use of argyrol, as in cases of relaxation of the ureters. Argyrol, when injected in the bladder, readily finds its way into the ureter and kidney, where it can be detected by radiography. Accordingly, on October 7, 1912, 10 per cent. argyrol was instilled in the bladder, the patient was put in the Trendelenburg position and an X-ray picture taken. Unfortunately, but little of the argyrol passed into the ureters and consequently only an outline of the bladder, together with the dilated lower ends of both ureters, could be recognized in the plate.

On October 18th, 75 c.cm. of a 20 per cent. solution of argyrol freshly prepared were again injected into the bladder and most excellent plates obtained. Immediately after exposure the bladder was thoroughly irrigated, so that no untoward symptoms followed the use of this strong solution. Indeed, the urine became clearer and the number of pus cells greatly diminished.

The plate (Fig. I.) shows the shadow of the bladder, the right ureter somewhat less distinct than the left.

A week later, 40 per cent. argyrol was injected, and the picture in Fig. II. was obtained. For some unexplained reason the argyrol failed to show in the right ureter, but the outline of the left ureter, its tortuous course, and the peculiar shape of the left renal pelvis is strikingly shown.

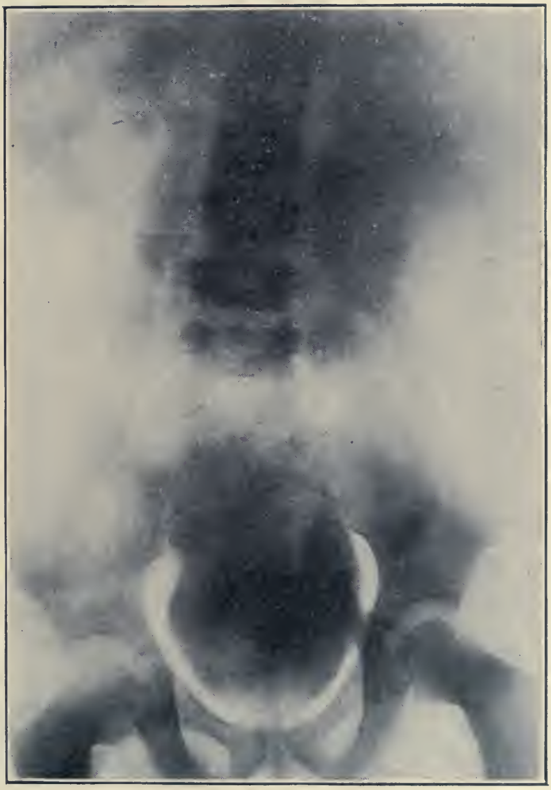

FIG. 1. Showing only bladder and dilated lower ends of ureters.

Considerable distention of the bladder was found on cystoscopy; at one time it held as much as 300 c.cm. of urine. No obstruction was found, either by the cystoscope (caliber 12 Fr.) or by a silk catheter (14 Fr.) by means of which the argyrol was injected. So that although there was no urethral obstruction to the passage of a rigid or flexible instrument, there was present, nevertheless, a considerable degree of urinary retention.

The etiology of the ureteral dilatation is not easy to determine in this case. According to Coustere (*Paris Thèse,* 1910) there are two kinds of hydroureter—congenital and acquired. The causes of congenital hydroureter are as follows:—

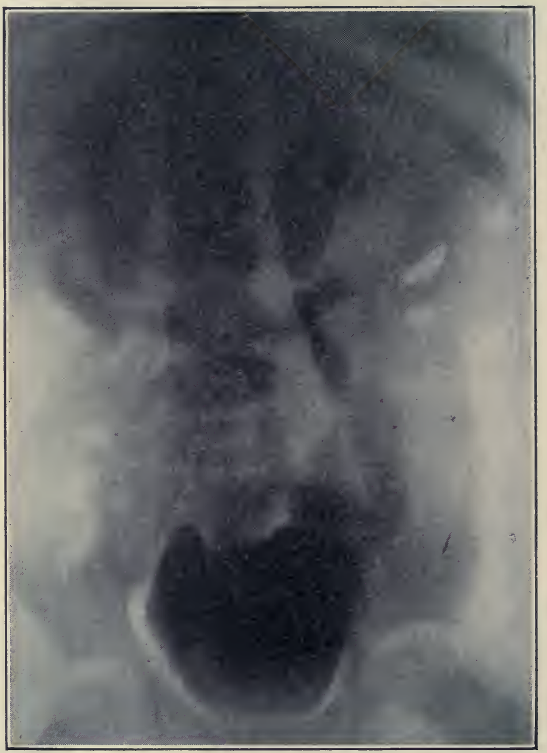

FIG. 2. Showing markedly the left ureter and dilated left renal pelvis.

A. Obstruction at the vesical orifice.

1. Imperforate vesical orifice, occurring either with a single or double ureter.

2. Stricture of the vesical orifice with or without prolapse of the ureter in the bladder.

3. Normal opening into the bladder associated with stricture.

4. Diverticulum of the ureter compressing the normal ureter.

B. Obstruction along the course of the ureter, either in the form of a stricture, valve, kink or twist.

Acquired hydroureter may be divided into three classes:—

1. Hydroureter due to obstruction outside of the ureter.

2. Hydroureter due to obstruction situated in the wall of the ureter.

3. Hydroureter produced by an obstruction in the lumen of the ureter.

Against the assumption that we are here dealing with the congenital variety is the fact that there is no demonstrable atresia, stricture, valve, kink or twist. If acquired in nature, it could certainly not have been caused by an obstacle outside of the ureter, for in this child with thin abdominal walls, anything compressing both ureters could easily have been felt if present. Nor is it probable that the obstruction was situated in the walls or lumina of the ureters.

Two other possibilities must be entertained: (1) A paralytic condition of the bladder due to a local poliomyelitis affecting the segment of the cord innervating the detrusor muscle. (2) An obstacle in the urethra which prevented a thorough emptying of the bladder.

As far as could be determined, there was no history of an attack of poliomyelitis nor were there any other evidences of a nerve lesion. Although the possibility of a urethral obstruction could not be ruled out, it was not such as to prevent the passage of a moderate size catheter.

We assume that the following conditions may obtain: First, that we are dealing with a case of dilatation of the ureters and pelves of the kidneys of anomalous origin; or, second, with an acquired type of hydroureter due either to a paralytic condition of the bladder or to an obstruction of the urethra that interferes with the outflow without preventing the entrance of a catheter. At any rate, the unusual findings and the mode by which the diagnosis was established are of sufficient interest to warrant our putting the case on record. Of interest, also, is the fact that the improvement, which apparently resulted from the use of pyocyaneus vaccines, was only temporary.

OXYCEPHALY.

BY MARK S. REUBEN, M.D.,

AND

ERNEST E. CLEAVER, M.B.

Cranial deformities may be congenital or acquired; the congenital deformities may be temporary or permanent; the temporary ones are mostly due to natal causes. Thus we have the flattening of the occiput in occipito-posterior positions, the dolichocephalus of face presentations, the pseudo-oxycephalus of a caput succedaneum, and a cephal hematoma. In all these cases the cranial asymmetry usually disappears within one to four weeks. The permanent cranial deformities may be associated with idiocy; in fact, cranial asymmetry is one of the characteristic signs of mental deficiency. Thus we have the microcephalic, hydrocephalic, oxycephalic, and other forms of skulls associated with idiocy. At present we are interested in cases of cranial deformity not associated with mental deficiency; cases in which the skull deformity is primary and all other signs are secondary. These cases have a normal mentality, but are usually, though not always, associated with changes in the optic nerves. The deformities of the skull associated with idiocy are usually secondary to deformities of the brain, but in the latter group the skull deformity is primary and all other signs and symptoms are secondary.

The most common cause of distortion of the skull in the latter group of cases is premature ossification of one or the other of the cranial sutures. Depending on which suture ossifies prematurely, we have various shaped skulls. If there be premature ossification of the sagittal suture, we have a scaphocephalic head; if of the fronto-sphenoidal suture, we have a leptocephalic head. Abnormal ossification of the frontal and parietal bones leads to a trigonocephalic head; premature synostosis of the occipital suture causes a flattening of the head in the occipito-parietal region, and, finally, premature ossification of parietal bones produces oxycephalus. This is the most frequent variety. Almost all of these cases sooner or later have a slight postneuritic atrophy of the optic nerve, visual power varies from full vision to total amaurosis, and the field of vision is found to be much contracted. Total or partial blindness is present in most cases. Other symptoms which may be associated with these peculiarly shaped skulls are epilepsy and symptoms of a cerebral tumor, as headache, vomiting and dizziness.

Various theories have been propounded to explain the premature ossification. Virchow, who was the first to describe this condition, thought it was due to a local inflammation of the dura mater; others believe it due to a fetal meningitis, and still others suggest a fetal periostitis as the exciting cause. Metzer thought that fetal rickets may be the underlying factor. Von Graefe was the first to note the eye changes associated with these distorted skulls in 1866. In addition to the optic neuritis and optic nerve atrophy, which usually occur early, there are also present, in the majority of cases, exophthalmos, divergent strabismus, limitation of movement of the globes, diminution of the aperture of the palpebral fissure, and nystagmus. Various theories have been suggested to explain the eye symptoms, but the most probable cause of the optic nerve changes is increased cerebral pressure, and the other eye symptoms are probably due to the peculiar formation of the eye sockets.

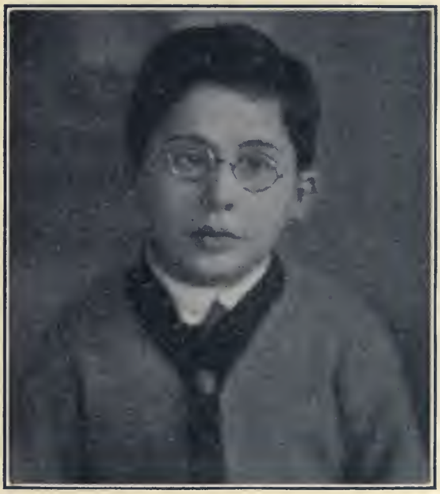

FIG. 1. Case 1.

In 2 cases that came to autopsy, narrowing of the optic foramina was noted, with thickening and general hyperostosis of the bones; and the conclusion was drawn that the immediate cause of the nerve affection was to be sought in meningeal changes and in the hydrocephalic condition of the brain. Weiss and Brugger examined 4 oxycephalic skulls. They found that these skulls have extraordinary development of the height, that the sagittal diameter is below normal, and that the lateral diameter more nearly approximated the normal skull. The height of the orbit is greater than the horizontal diameter, and the most marked difference lies in the much greater shallowness in the oxycephalic orbit, the normal being 10 mm. deeper than the average oxycephalic orbit. This change is mostly due to change in position of the greater wings of the sphenoid; this causes the prominence of the eyeballs. The optic foramina were not abnormally narrowed in any of the cases; the dorsum sellae turcicae is markedly enlarged and pushed forward; these skulls are usually made of very thin bones.

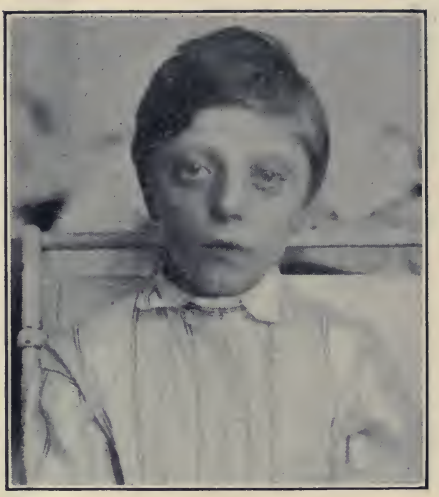

FIG. 2. Case 2.

REPORT OF CASES.

CASE I. E. G., aged eight years, came to the Vanderbilt Clinic complaining of dyspnea and cyanosis. Physical examination revealed the presence of a congenital heart lesion. The head is distinctly oxycephalic; there is a marked prominence over the sagittal suture; the vertical diameter of the skull is longer than in normal skulls; eyesight is poor and divergent strabismus is present; mentality normal.

CASE II. M. L., aged seven and one-half years, came to the Vanderbilt Clinic, accompanying a younger sister who was being treated. He did not complain of anything, but the peculiar facies and shape of skull attracted our attention to the boy. Here, too, there was a marked prominence over the sagittal suture. The shape of the skull as seen in the X-ray plate is represented in Figure 2. The occipito-bregmatic and the mento-bregmatic diameters are longer than in normal cases; there is also a tendency of the skull to be dolichocephalic. As in the other cases mentality was normal, eyesight was good, exophthalmos and divergent strabismus were present. The peculiar features of this case are the marked dilatation of the veins of the face and neck. At each outer canthus of the eyes there were many aberrant veins emanating, which anastomosed with the facial and external jugular veins. The facies of the boy is quite striking. Evidently there was some obstruction to the ophthalmic veins. Another peculiarity was the presence of a distinct opening in the skull beneath the external occipital protuberance; no encephalocele was present. This opening was probably of a compensatory nature.

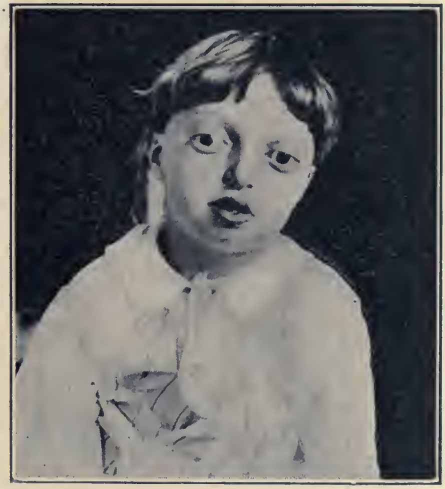

FIG. 3. Case 3.

CASE III. J. W., aged five and one-half years, came to the Vanderbilt Clinic complaining of pain in the legs. Here, too, the facies is so striking that our attention was immediately directed to the skull. As in the other cases the condition was present since birth; mentality is normal, and eyesight is good. The X-ray plate of this boy showed the same features mentioned in the above cases. The marked exophthalmos and the divergent strabismus are quite evident in the photograph.

SUMMARY.

Oxycephaly is a congenital deformity of the skull and is usually due to a premature ossification of the cranial sutures. It is far more frequent in males, it may occur in two members of the same family, and it may be transmitted to offspring. In the type of oxycephaly under consideration the mentality is normal. These cases are usually associated with eye symptoms, which come on early in the disease. Other symptoms associated with this condition may be: early appearance of the teeth, peculiarities of elbow joints and other joints, encephaloceles, general epileptic seizures, and symptoms simulating brain tumor. The etiology is obscure. The optic neuritis and optic atrophy are probably due to increased cerebral pressure. The exophthalmos, the intermittent dislocation of the eyeballs, and the strabismus are probably due to the peculiar formation of the eye sockets.

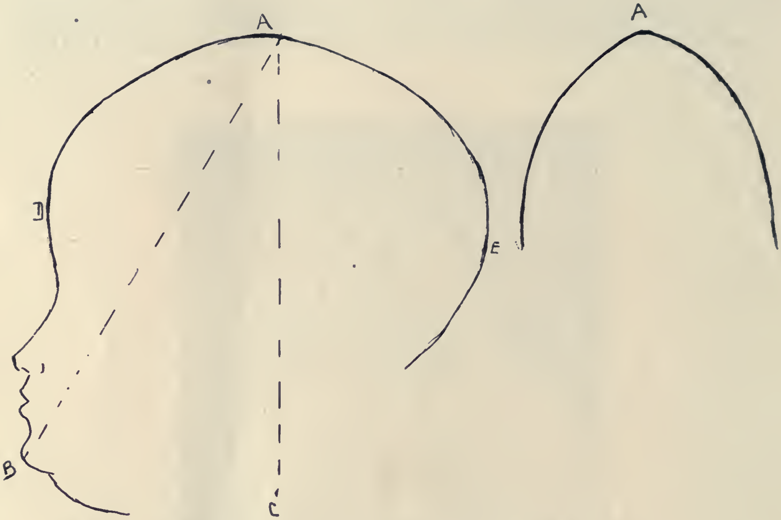

FIG. 4. Showing characteristic contours of oxycephalic head.

1967 7th Avenue.
351 West 51st Street.

METABOLISM STUDIES OF AMAUROTIC FAMILY IDIOCY, WITH CLINICAL AND PATHOLOGICAL OBSERVATIONS.*

BY A. HYMANSON, M.D.,

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This peculiar fatal family disease has attracted considerable attention throughout the last thirty-two years. Its etiology is as yet obscure, and the treatment is positively *nil.* This malady offers as yet a large field for investigation.

I present here 6 cases of Tay-Sachs disease. The first 2 cases were used in metabolism work and came to autopsy. The next 2 cases are rather unique, because two brothers were married to two sisters, and the parents were at the same time first cousins, and several of their children were afflicted with this disease. The last 2 cases are of interest, because the disease occurred in twins.

Of this series, Case I. is described completely, while in the other cases I dwelt mostly on the family history, as the symptoms and course of the disease are very similar.

CASE REPORTS.

CASE I. Louis G., one year old, was first seen by me on October 28, 1911. Parents, Jewish—were born in Russia—are healthy. They have been in this country seven years, and married two years. No history of syphilis, alcoholism, or tuberculosis in either family. Baby's great-grandparents were first cousins. Baby's paternal grandfather was supposed to have had a similar illness as this baby had and it lasted until he was seven years old, when he was completely cured.

The baby was their first child; his delivery was normal. He was breast-fed until eleven months. He was very restless until three months old; he had an attack of bronchitis when five months old; he was mostly constipated.

*** From the Chemical and Pathological Laboratories, Beth Israel Hospital, New York City.**

He was apparently well until six months old, gave his hands and grasped things. He was able to turn on his side, but was never able to hold up his head. It used to fall forward or backward. At the seventh month, the mother noticed he observed things less, was quite drowsy and indifferent; although he gained in weight, he lost strength. His extremities became weaker daily. His sense of taste was not impaired—if milk was given him without sugar he refused to drink it.

Physical Examination.—Baby had a vacant expression; pupils were equal; reacted to light. Baby was well developed; he weighed 27 pounds. Marked weakness of extremities; no paralysis, but somewhat spastic. The reflexes of the lower extremities were present; no tache; no Babinski; no Kernig and no ankle clonus. Anterior fontanel, open; circumference of the head, nineteen and one-half inches. When head was bent backward child rolled its eyes upward and was in a convulsive state. When he was held up his head fell mostly forward on his chest. There were no abnormalities found in mouth, nasopharynx, lungs, heart or abdominal organs. Temperature, pulse and respiration normal.

The eyes were examined by Dr. Martin Cohen, who found a slight atrophy of the discs and the characteristic cherry-red spot in the macula lutea. Dr. Cohen also made a Wassermann and a Luetin test in the child and in the parents, with a negative result. I kept the child under my observation for three months; during this time he lost about 8 pounds. His weakness, drowsiness and anorexia kept on increasing, and his extremities became more spastic.

On July 13, 1912, the child was admitted to the Beth Israel Hospital. I found there were no material changes in the child's condition, except that he was much thinner and weaker than before. He would lie with his limbs and body flaccid and would take no interest in his surroundings; would start suddenly on hearing any noise.

Dr. Ervin Torok also examined the child's eyes and found the characteristic picture more marked. Von Pirquet and Moro tests were negative. Another Wassermann test was made on the child and the result was negative. The blood and urine examination was normal. A lumbar puncture was made; the pressure in the spinal cord was slightly increased. The fluid was clear, a few lymphocytes were found, but no pathogenic organisms. A meal-test was given the child, and an hour later the gastric contents were examined. Total acidity, 9 per cent.; free HCl, 3 per cent.; free A. + A. salts, 3 per cent.; loosely combined acid, 3 per cent.; also some yeast cells were found.

During the child's eight weeks' stay in the hospital the temperature varied between 98° and 104° F. The rise of temperature was evidently due to an abscess of the scalp, which took three weeks to heal. There was progressive emaciation and at times the pulse became very weak and almost imperceptible. We were obliged to administer stimulants hypodermically. He refused to take food, and for over two weeks we resorted to rectal feeding; also forced feeding by introduction of a tube into the stomach and oftentimes into the duodenum. While these methods of feeding gave some temporary improvement, still the child kept on losing weight.

During the fifth week of the child's stay in the hospital (three weeks before its death), the temperature became normal and the child stopped vomiting. Dr. Max Kahn and I studied the metabolism of this case, the report of which will be given later.

The child died of an attack of bronchopneumonia on September 7, 1912, and an autopsy was performed by Dr. Eli Moschcowitz four hours after its death.

CASE II. Yetta K., twenty-two months old, was admitted to Beth Israel Hospital August 22, 1912. Parents, Hebrews; not related; were married four years; this was their only child. No history of insanity in the family. The mother's brother was married to a cousin; one of his children was unable to walk until seven years of age; he is now doing well.

Past History.—The baby was breast-fed until fourteen months old. She had two attacks of pneumonia during the last winter. She was mostly constipated. The symptoms of the disease began when the child was seven months old. Her eyes were examined by Dr. Ervin Torok, who found a typical cherry-red spot and an atrophy of the optic nerves. The examination of the urine and blood was normal. The symptoms and course of the disease were similar to the previous case. Metabolism work was done on this case also by Dr. M. Kahn and myself four weeks before the child's death. The child died September 7, 1912.

CASE III. Annie H., fifteen months old.

Family History.—No syphilis. Mother's grandfather died at the age of sixty-five; he was blind eight years before death. There was no external disease of the eyes. Child's parents are first cousins. The mother gave birth to 8 children, two of whom died in Russia of some meningeal trouble. A third one was under my care three years ago, and died of typical Tay-Sachs disease. This patient was examined by Drs. P. O. Born, C. Kohler and Martin Cohen. The parents have two healthy children, ten and thirteen years of age, respectively.

Physical examination and symptoms of case A. H. were almost the same as in previous cases, except the examination of the eyes by Dr. M. Cohen revealed atrophy of optic nerves but no changes of macula lutea. This case was also seen by Dr. B. Sachs and he thought it was a case of Tay-Sachs disease without distinct eye signs. One month later, five weeks before the child's death, an ophthalmoscopic examination revealed distinct white specks with red centers near the macula. The child's weight before its death was a little over 10 pounds. She died at the age of eighteen months.

CASE IV. Sam. H., one year old.

Family History.—The same as in Case III., since two brothers were married to two sisters, and the parents of Cases III. and IV. are first cousins. The father forty-three years old, the mother thirty years old, born in Russia. They have been four years in the United States. They were married fifteen years; always in perfect health. Mother had no miscarriages; had 7 children; 3 living; 3 died from some meningeal complaint, in Russia, at the ages of one, two and three years respectively. One death was perhaps from a similar ailment as that of patient described.

Eyes were examined by Drs. Martin Cohen and Ervin Torok; they found typical Tay-Sachs disease. Symptoms and course of disease same as in previous case. Child died at the age of twenty-one months.

CASES V. AND VI. Irving and Sidney M., twins, came under my care during the spring of 1912, when ten months old.

Family History.—No syphilis, alcoholism or tuberculosis in the family. The children's great-uncle (brother of children's grandfather on the paternal side), whose marriage was not consanguineous, had 11 children—7 were healthy, 4 died at the age of two years. Father of the twins said that these 4 children who died were paralyzed—could not see nor grasp anything. He thought his twins' ailments were similar.

Parents of twins are not related. Mother gave birth to 3 children besides the twins. Two are perfectly well, one having died eleven years ago of the same disease, which case I reported (I.).

The twins first showed symptoms of the disease near the end of the sixth month. Their eyes were examined at the New York Eye and Ear Infirmary by Drs. W. E. Lambert and Cinberg, also by Dr. Ervin Torok. They found the typical ophthalmologic picture of Tay-Sachs disease. The twins became emaciated gradually, and died at Bellevue Hospital at the age of seventeen months, one within four days of the other.

METABOLISM EXPERIMENTS AND CHEMICAL ANALYSES.*

Nitrogen, sulphur and phosphorus partitions were conducted on the excreta of 2 cases of amaurotic family idiocy. The urine and feces were collected for a period of five days in the first case, and four days in the second case, and each daily portion was separately analyzed.

The analytical methods employed were the ones in common use in the laboratory:—

Total nitrogen, Kjeldahl method.

Total phosphorus, by fusion with sodium hydroxide and nitrate.

Total sulphur, by the Benedict method.

Total sulphates by direct precipitation with hydrochloric acid and barium chloride, according to the method of Folin.

Neutral sulphur was estimated by the differences between total sulphur and total sulphates.

Total phosphates in the urine by titration with uranium acetate.

Ammonia, by the Folin aeration method.

Total acidity, by titration with N/10 Na OH, after the urine with potassium oxalate.

The stool was dried over the water bath after the addition of hydrochloric acid and alcohol.

CASE I.—Child L. G., twenty-one months old, male, was fed on raw milk and two eggs a day. An equal amount of milk (as much as the child ingested daily) was analyzed in the laboratory. The eggs were also analyzed, *i.e.*, eggs weighing the same amount were analyzed after due subtraction was made for the weight of the egg-shells.

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* All the chemical analyses were made by Dr. Max Kahn, Director of the Beth Israel Hospital Chemical Laboratory, and Instructor in Biological Chemistry in the College of Physicians and Surgeons, Columbia University, New York, to whom I express my sincere thanks.

ANALYTIC DATA

INTAKE.

DAY.	N.	S.	P.
1st	9.3762	1.2698	2.7605
2d	9.056	1.4852	2.3207
3d	12.7893	2.3782	1.4708
4th	11.2912	2.7456	2.9632
5th	10.2748	1.2757	lost

OUTPUT—URINE.

DAY.	N.	NH_3	S.	TOTAL-SO_4	NEUTRAL-SO_4	P.
1st	3.2134	0.2134	0.5105	0.425	0.0805	0.4085
2d	3.1578	0.2053	0.4213	0.3276	0.0937	0.5327
3d	3.9315	0.1976	0.4266	0.2563	0.1703	0.4005
4th	4.622	0.1874	lost	0.4281	.....	0.5702
5th	4.1357	0.2565	0.6853	lost	.....	0.4844

OUTPUT—FECES.

DAY.	N.	S.	P.
1st	0.3253	0.6245	0.1124
2d	0.2213	0.4514	0.1235
3d	0.3715	0.6372	0.0956
4th	0.3442	0.5134	0.147
5th	0.5163	0.5232	0.1515

CASE II. Y. K., twenty-three months old, female.

INTAKE.

DAY.	N.	S.	P.
1st	8.4652	1.024	1.7246
2d	8.3279	1.092	1.5113
3d	7.6243	0.956	1.9332
4th	6.5452	2.315	1.842

OUTPUT—URINE.

DAY.	N.	NH_3	S.	TOTAL-SO_4	NEUTRAL-SO_4	P.
1st	2.0532	0.1248	0.3784	0.304	0.0744	0.2721
2d	2.4246	0.1562	0.3962	0.3179	0.0883	0.2962
3d	1.9732	0.2092	0.4115	0.3854	0.0261	0.4505
4th	2.1728	0.1724	0.4237	0.3728	0.0509	lost

OUTPUT—FECES.

DAY.	N.	S.	P.
1st	0.2145	0.3704	0.1756
2d	0.2096	0.3608	0.1278
3d	0.3272	0.4291	0.2053
4th	0.1965	0.3162	0.1894

In the succeeding tables we will tabulate the results in such wise as to see what conclusions can be drawn from these analyses. We will first consider the average intake and outputs for the periods studied in both cases, and we will compare these figures with the results obtained by former investigators.

CASE I.

AVERAGE DAILY INTAKE.

N.	S.	P.
10.5575	1.4309	2.3763

AVERAGE DAILY OUTPUT—URINE.

N.	S.	P.
3.81008	0.5109	0.4752

STOOLS.

N.	S.	P.
0.3557	0.5499	0.126

CASE II.

AVERAGE DAILY INTAKE.

N.	S.	P.
7.7406	1.346	1.7527

AVERAGE DAILY OUTPUT—URINE.

N.	S.	P.
2.1556	0.4024	0.3396

STOOLS.

N.	S.	P.
0.2369	0.3691	0.1745

RETENTION PERCENTAGE.

CASE I.

N.	S.	P.
60.56%	25.87%	74.71%

CASE II.

N.	S.	P.
68.78%	94.27%	76.38%

ABSORPTION PERCENTAGE.

CASE I.

N.	S.	P.
96.6%	61.9%	95.1%

CASE II.

N.	S.	P.
96.9%	72.5%	90.04%

Child No. 1 obtained from 1,000 to 1,300 calories daily and child No. 2 from 800 to 1,000 calories daily.

We will compare these tables with the results obtained in the study of the metabolism of normal children.

Rubner and Heubner.[2]

Normal Child.	Intake.	Urine.	Stool.	Absorption.	%	Retention.	%
7½ months . .	4.26	3.067	0.281	3.979	93.4	0.912	36.7
Camerer.[3]							
Child 1 year .	5.0	4.0	0.7	4.3	86	0.3	6.0

From the figures of the foregoing tables it is quite plain that the metabolism of cases of amaurotic family idiocy is not at all disturbed. In fact, if anything, the absorption and retention of the various food fractions is above the normal, in several instances very much, and abnormally so.

Postmortem and Microscopic Examination in Case I. by Dr. Eli Moschcowitz, Pathologist of the Beth Israel Hospital, to whom I am indebted for the following report:—

Autopsy was performed on baby Louis G. four hours after death.

GENERAL PATHOLOGIC REPORT.

The body was very much emaciated; lungs contained few subpleural petechiæ of lower lobes. Surface of the lungs was mottled, congested areas alternating with normal lung tissue. On section a large number of small red areas scattered throughout both of the lower lobes. There was a slight edema. Bronchi and trachea normal. Mediastinal glands not enlarged. Heart, stomach, pancreas, spleen, intestines, mesentery and testicles normal. Brain and spinal cord also normal. Liver normal in size, pale and firm. On section it looks yellowish brown. Gall bladder normal. Kidneys pale yellow, otherwise normal. Lymph nodes somewhat enlarged. Eyes showed typical macula characteristic of amaurotic family idiocy.

MICROSCOPIC EXAMINATION.

Lungs.—The alveoli in the hepatized areas is filled with exudate consisting in the main of large blood cells, many polynuclear cells and fibrin. The bronchi are filled with exudate consisting of polynuclear cells. The capillaries throughout the lung are dilated. The arterioles are large and distended with blood. These pneumonic areas are notably distributed about the bronchi.

Thymus.—The thymus is interspersed with dense strands of connective tissue occupying approximately one-half of the microscopic field. The "lymphoid" tissue is sparsely cellular. Hassal's corpuscles are abundant, large, and consist mainly of coarse, granular material arranged concentrically. Few reveal any cellular element. Blood vessels are abundant.

Heart.—Normal.

Liver.—A comparatively small number of cells show fatty droplets, otherwise normal.

Spleen.—Normal.

Kidney.—The cells of the tubules in the cortex are swollen, granular, and the edges are undefined.

Pancreas.—Normal.

Testes.—Normal.

Thyroid.—Normal.

SPINAL CORD.—The cells of the anterior horn are enormously swollen and are the most conspicuous objects in the microscopic field. They are at least three or four times the normal size, are circular or oval in shape and completely fill the spaces in which they lie. The nucleus is large and eccentric, and pale, only small traces of a chromatin network being still visible. The nucleolus is sharply outlined and stains deeply. The nucleus is immediately surrounded by a deeply staining cell body, the depth of the color gradually becoming fainter as we proceed outward, until at the periphery the cell body stains very faintly and with a hematoxylon is almost colorless. The dendrites adjacent to the nucleus are also stained deeply for a short distance; the remaining dendrites take the faint stain of the peripheral portions of the cell body. With the highest power an extremely granular appearance of the cell body is noted.

The ganglion cells of the posterior horn show the same changes, but not quite as marked as the anterior. All the ganglion cells are affected, none seem to have escaped. The white matter of the cord shows nothing abnormal. The glia cells are unaffected.

Posterior Ganglia.—The ganglion cells show the identical changes as the cells of the anterior horn. None has escaped.

Cerebral Cortex.—The ganglion cells of the gray matter are all affected by the same changes noted in the anterior horn cells, but not quite as pronounced. There does not appear to have been any displacement of the layers, nor have these changes affected the various areas unequally. The cells from the frontal area, for instance, are as equally affected as the cells of the temporal, parietal or occipital.

The glia cells are unaffected.

Both gray and white matter are moderately edematous.

Basal Ganglia, Optic Thalmus, the Pons, Medulla and Floor of the Fourth Ventricle.—The ganglion cells show the same changes above described. The cells of the nuclei at the floor of the fourth ventricle are profoundly affected.

Cerebellum.—The Purkinje cells are moderately smaller and reveal cells with the characteristic changes above described. In addition the white matter is more abundant with glia cells than normal. Pia and meninges normal.

Optic Nerve.—The optic nerve presents a peculiar appearance. It is made up of numerous small bundles which are separated from one another by spaces of unusual width. This appearance is more pronounced as we approach the center of the nerve. There is far more fibrillar connective tissue than is normally seen, and the majority of the nerve fibers do not stain at all.

REMARKS.—In 1908, Apert[4] found 106 cases recorded; of these, 73 cases occurred in 25 families. Since then there were about 25 more cases recorded.

A neuropathic predisposition in the relatives of one or both parents has been observed in the majority of the cases recorded. Blood relationship between the parents has been observed in a number of cases. In 4 out of 7 cases which came under my observation the parents were first cousins and one couple was distantly related. In 12 cases recorded by Dr. H. Kowarski[5] 6 were children of consanguinity.

Twins are not exempt from the disease. A similar instance to mine (Cases V. and VI.) was recorded by Dr. F. J. Baildon.[6] He claims it is the first instance known to him of the disease occurring in twins.

While the victims of the disease are of Jewish parentage, still it does not seem to be a racial malady altogether.

According to Heverock,[7] who collected reports of 86 cases, 61 occurred among Hebrew children, 7 among Gentiles, and of 17 the race was not noted. Another fact worth mentioning is that the juvenile form of this disease (Spielmeyer and Vogt), while being common among Gentiles, is rare among Jewish children.

Not long since, the profession thought that climate and environment had something to do with this disease, as it was only found among the Russian and Polish immigrants in England and the United States. Of late, it was discovered that it is quite common in Russia; also, Kowarski,[8] in the course of two years, has seen 12 cases, and described 6 of them, which occurred in Russia. Judging from the family histories of his cases, other children in the same families have died of this disease, which was evidently not recognized. The German Jews are not exempt from the disease.

Syphilis, while it is a causative factor of other forms of idiocy, does not appear to be common in this disease. The fact is, antisyphilitic treatment has been tried by a great many observers and by myself without avail.

This malady occupies a peculiar position among the familial diseases. We are dealing with a child who is apparently healthy at birth, morphologically supposed to be normal; he is developing gradually and doing quite well, until the age of five or six months. He then begins to retrograde, and gradually there is a degeneration of every ganglion cell in the brain and spinal cord. At the end of two, or thereabouts, he dies of cachexia.

What causes this trouble? Several theories have been advanced. Some years ago Dr. Hirsch advanced a theory which was favored by Dr. A. Jacobi—that infection was derived from mother's milk—but it had to be abandoned, because Drs. Sachs and Schaffer have seen the same malady in babies who were fed artificially or raised by wet nurses.

The suggestion of bacterial toxins causing the disease is denied by Drs. Poynton, Parsons and Holmes,[9] who also claim the disease is not due to arrested development, but to some inherent biochemical property of the protoplasm of the cells.

About five years ago Dr. A. Gordon[10] advanced a theory that the disease owes its origin to a failure of metabolism, the result of some gland lesion or anomaly. This theory has not been taken up until recently, when careful examination of all organs of the body, including the glandular system, has been undertaken and reports of metabolism work began to appear in medical literature.

Dr. Brooks[11] found some morbid changes in several ductless glands in one of his cases.

Dr. Mott[12] claims that he examined all tissues of the body in several cases and did not find any glandular lesions, still he found chemical changes in the nerve cells in 2 cases. He thinks the changes were due to a failure in the nuclear material to build up nucleoprotein Nissl substances out of lipoid substances contained in the cytoplasm. He also found a relative diminution in the lipoid form of phosphorus and sulphur.

Drs. H. Heiman, S. Bookman and B. B. Crohn[13] have done metabolism work in two amaurotic cases in the early period of the disease and found that absorption from the gastrointestinal tract and retention within the body were normal, even better than normal. Furthermore, the assimilation of the most important parts of the nerve tissue, phosphorus and sulphur were not disturbed. Dr. Kahn and I, in our metabolism experiments in Cases I. and II., in the latter part of the disease when the children were already emaciated (three and four weeks before death), also found that metabolism in this disease was not at all disturbed. Our metabolism results at the end of the disease were somewhat similar to the beginning of the disease in the 2 cases described by Drs. Heiman, Bookman and Crohn.

It seems so far, all our theories and experiments do not render this mysterious disease more intelligible. I believe the gastro-intestinal tract and the ductless glands ought to be studied more carefully, and the metabolism work done repeatedly during the several stages of the disease. By so doing, our knowledge of the etiology of this disease may become more satisfactory.

In conclusion, I will say, while we are studying this disease, it is the duty of every physician to discourage marriage of near kin, also between persons in whose families there has been some neuropathic taint.

REFERENCES.

1. Hymanson, A. New York Medical Journal, July 28, 1902.
2. Rubner and Heubner. Ztschr. f. of Biol., 1899, No. 38, p. 315.
3. Camerer. Stoffwechsel des Kindes.
4. Apert. Sem. Med., 1908, p. 25.
5. Kowarski, H. Jahrb. f. Kinderhk., Berlin, July, 1912.
6. Balldon, F. J. Liverpool Medical and Chirurgical Journal, 1912, Vol. XXXII., p. 308.
7. Heverock. Neurol. Centralb., 1904, p. 948.
8. Kowarski, Jahrb. f. Kinderhk., Berlin, July, 1912.
9. Poynton, Parsons and Holmes. Brain, 1906, p. 180.
10. Gordon, A. New York Medical Journal, 1907.
11. Brooks. Transactions Association American Physicians, 1911.
12. Mott. Proceedings Royal Society of Medicine, 1911, Vol. IV., Pathological Section, pp. 147, 198.
13. Heiman, Bookman, Crohn. American Journal Diseases of Children, Vol. IV., 1912.

COLLOID THERAPY IN GRAVE AND ANOMALOUS CASES OF MEASLES.—It is interesting, in connection with Netter's recent paper (*Universal Medical Record,* 1913), to read an article in the *Gaz. degli Osped. e delle Clin.* for February, 1913, by Galli, who reports that the effects are marvellous in both anomalous and complicated cases. Galli, who uses the electrargol preparation, believes that this form of treatment is by far the best and most rational in the kind of cases under discussion, and holds that its efficacy is in relation not so much to the condition of the patient as to the stage of the malady. It should, therefore, be used as early as possible. Injections should not be discontinued at the first sign of improvement, but proceeded with until evidently decisive results have been obtained.

A CAMPAIGN OF PRENATAL HYGIENE IN NEW YORK.*

BY PHILIP VAN INGEN, M.D.,

New York City.

Wherever consistent, determined effort is being made the infantile mortality rate is falling, slowly, to be sure, but nevertheless falling. When we study the details of the mortality returns certain facts are brought out very sharply. In New York City the rate for the three years 1905 to 1907 was 152.3; for 1908 to 1910, 127.8. In 1911 it was 111.6 and in 1912 105.3. There has been a marked reduction in the deaths of babies, but this has practically all occurred at ages over one month, as will be seen from the following:—

	Under One Month.	One Month and Under One Year.
1908 to 1910	43.3	93.2
1911	40.4	82.0
1912	41.1	65.3

The decrease has been marked at the more advanced age, while it has been very slight at ages under one month.

About 40 per cent. of deaths in babies are set down in mortality tables to that group of conditions known as "wasting diseases," among which we find such vague terms as "congenital debility," "inanition," "malnutrition," "lack of breast milk," etc. These deaths occur mostly during the first month of life, and are sometimes called the "unavoidable" infant mortality. It is generally admitted that these conditions are largely the result of processes acting upon the child before its birth through the mother. If this is so, the prevention of this 40 per cent. of the infantile mortality must be accomplished by methods directed toward the mother before the child is born. We must try to secure a healthier child by having a healthier mother—and one who is better able to nurse her baby.

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* Read at the English Conference on Infant Mortality, London, August 5, 1913.

In a paper read before the Royal Statistical Society, in 1912, Dr. Dudfield said: "I cannot help thinking that we are approaching the lowest limit of the rate of mortality which can be expected to be attained by the present methods of prevention. Such methods are, for the most part, concerned with postnatal causes of mortality. Antenatal causes, except so far as ordinary sanitary activities may affect them, have not been taken up at all."

The purpose of this paper is to present a brief statement of the campaign carried on by the New York Milk Commission during the last twenty-two months, its object being the reduction of the so-called "unavoidable" infantile mortality, due to antenatal conditions.

The work has been carried on in certain districts in the borough of Manhattan, where investigation showed the births and infant deaths to be most numerous. The borough of Manhattan is the old city of New York. It is the most congested of the five boroughs comprising the Greater City. Some of the wards, with an area of from 100 to 200 acres, have a density of population of from 500 to 700 per acre. Certain city blocks run as high as 1,500 to 1,600 to the acre. In the entire borough, which contains the wealthiest as well as the poorest districts, an average of over thirty people are housed in each dwelling.

Over 47 per cent. of the population are foreign born, and an additional 35 per cent. are of mixed foreign and native parentage. Of the births reported during the years 1910 to 1912, 67.7 per cent. were to foreign-born parents, and in another 9.8 per cent. the mother was of foreign birth. Not only is the proportion of children of foreign-born parents very high, but in 54.4 per cent. of all cases the parents came from Russia, Poland, Italy and Austro-Hungary—the most difficult class of people to deal with on account of ignorance and their tendency to segregate and live according to the customs of the home country. One can walk for many blocks in certain sections of the city and not see one word of English displayed in the windows, or hear one spoken, except by the children of school age.

Over one-half of the confinements among the poorer parts of the city are attended by midwives. Our situation in regard to the midwife is not so fortunate as that here in England. Supervision is poor, owing to the enormous amount of work which the Division of Child Hygiene of the Health Department has been obliged to assume without sufficient funds for carrying it on. Instruction has only just been begun, and that in the face of strong, and, I think, misguided opposition.

Such are the conditions under which we have worked, and we have chosen the districts where they are at their very worst, our object being to see what can be accomplished under existing conditions. The conditions are in urgent need of correction, but years must elapse before that can be accomplished, if it ever can, and meanwhile the babies are dying.

The work is carried on by eight trained nurses under the supervision of a directing nurse and a field physician. Two volunteer medical directors have general direction of the work, and a medical council stands ready to advise as to methods and special matters which come up. The nurses were chosen with the greatest care, for patience, tact and devotion are unusually necessary in this work. They were given a thorough preliminary course of instruction in the hygiene of pregnancy, the causes of the mortality during the first month of life, and the great importance of maternal nursing. They were obliged to thoroughly acquaint themselves with the existing facilities for relief in all kinds of emergencies. Then they were sent into their districts.

They came in touch with expectant mothers by house to house visiting, and by coöperation with the municipal milk stations (which are really baby welfare centers), relief societies, churches, settlements, etc. As soon as an expectant mother is found the nurse sets out to make that woman her friend, and with very few exceptions she succeeds. A careful record is taken of home conditions, family conditions and previous confinements. The situation is then reported to headquarters, and the nurse outlines her plan of action. If abnormal physical conditions are found the woman is advised to consult a physician or hospital, and it is the duty of the nurse to see that her advice is carried out, even to the extent of going with her patient. The field physician does not see or treat the woman except under exceptional conditions. We believe there are sufficient facilities already existing.

Every woman is visited every two weeks in her home, where actual conditions are seen and discussed. If relief is needed, the nurse interests the proper organization. If the bread winner is out of work, she tries to find employment for him. If the mother must work, she is urged to do the kind which will do her the least harm, and is helped to find it. If the woman is tired out, and the home is already over-run with children, arrangements are made for the children to be sent away for a holiday. And all the time the nurse is teaching, and her advice is usually followed. Routine visits are made every two weeks. In special cases they are made much oftener, sometimes every two or three days. Through coöperation with settlements and other social organizations, each nurse has a headquarters, where she spends an hour every day, and where she may be found in emergency. At her first visit the nurse leaves an addressed postcard asking her to call at once, which, when mailed, secures a visit within twenty-four hours. As soon as the baby is born this card is sent to the nurse, often with such an addition as "My mother bought a little girl," added by one of the children. Visits are then made every three to four days, until the baby is a month old, by which time it is expected that the mother will put herself in touch with the milk station, and keep her baby under supervision.

As has been said, the object of this work is to demonstrate what can be accomplished under existing conditions. The New York Milk Committee was instrumental in committing the city to the policy of infant milk, or welfare stations, by carrying on such stations for a year and submitting the results to our financial authorities. New York now boasts fifty-five such infant welfare stations under city control, and we hope in another year to see the prenatal work made a part of the welfare station programme.

Careful records have been kept in every case, and up to the first of June of this year, 1,819 women have been cared for for at least two months of their pregnancy. No cases where the supervision was for less than two months are included. We judge of our results by the number of stillbirths, the number of babies dying during the first month of life, and the ability of the mothers to nurse. These facts are set forth below:—

Mothers Supervised:

	Number.	Percentage.
Survived	1,817	99.89
Died	2	0.11
Total	1,819	

Babies:

	Number.	Per M. Pregnancies.
Born alive	1,779	963.1
Stillborn	68	36.9
Total	1,847	

Babies Born Alive:

	Number.	Per M. Live Births.
Survived first month	1,726	970.2
Died during first month	53	29.8
Total	1,779	

Babies Alive at End of First Month:

	Number.	Percentage.
Nursed entirely	1,610	93.3
Nursed partially	62	3.6
Artificially fed	54	3.1

Making allowance for plural births, 94.1 per cent. of the mothers were nursing entirely, 3.3 per cent partially, and only 2.6 per cent. had ceased to nurse their babies. Ten mothers of twins were nursing babies entirely, and five others.

Two of the women died while under observation. One death was due to placenta previa, and the other to acute toxemia of pregnancy.

If we compare these figures with the general statistics for the Borough of Manhattan, including the most fortunate of the population with the poorest, the results seem to be even more encouraging. The period covered is the same in both cases, so that seasonal conditions had equal influence.

	Borough of Manhattan.	Supervised Cases.	Percentage Difference.
Stillbirth rate	48.1	36.9	23.3
Deaths under one month	40.6	29.8	26.6

Such are, in brief, the most obvious results of our work. I realize that in comparing our comparatively small number of cases with the much greater number for the entire borough there is a certain margin of error. The stillbirth rate for the borough is unquestionably too low, and our figures in this group include every pregnancy which terminated with a loss of the product of conception. They are certainly suggestive, to say the least.

We believe that ignorance is a very important cause of the mortality among very young babies. Such work as has been described can be carried on by any organization doing home visiting work, and of the absolute necessity of the work being done by individual contact in the home, we are absolutely convinced. Classes will accomplish something, perhaps a good deal, but personal contact will, and does, accomplish far more.

We believe in what Mr. Alderman Broadbent has said: "In motherhood, properly instructed and respected, there is a potentiality of health and well-being for future generations beyond the dreams of the most enthusiastic sanitarian." We are trying to make expectant motherhood properly instructed and respected.

The Treatment of Pleurisy in Children.—Concetti, of Rome, in a paper on bronchopneumonia in infancy, in the *Dublin Journal of Medical Science* for January, 1913, translated by Mahood Fox, remarks that "dry pleurisy we treat either by warm, moist packs or by painting with iodin. When fluid is present, thin, serous, slightly corpuscular, we aspirate, and we seldom find it to fail in causing the permanent disappearance of the effusion. When the pleurisy is purulent, the one indication is to remove the fluid, and the question naturally arises, Is the treatment in cases of infancy different from that of adult life? In infancy it is less difficult to attain a cure by aspiration, or repeated aspiration, without recourse to pleurotomy. If the character of the fluid is seropurulent, not too thick, and of recent formation, it is not unusual to effect a cure with one or two aspirations. Still, if the fluid is thick and scanty, you yet may effect a cure by repeated aspirations. In the presence of large collections, one or two aspirations prior to operation lessen the risk of pleurotomy. In cases of large collections in the left side, with marked displacement of the heart to the right, a rapid withdrawal of the fluid may cause shock and arrest the heart by syncope. After aspiration the fluid, if reproduced, is always less in quantity than before, and there is a tendency in the cavity to contract, and the heart becomes habituated to return to its normal position. For which reasons aspiration should precede pleurotomy."

THE SCHOOL CHILD IN ITS RELATION TO EUGENICS.

BY L. T. ROYSTER, M.D.,
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"Know thyself, presume not God to scan,
The proper study of mankind is man."

To the scientist of to-day there appears a strange admixture of truth and misconception in these words of the poet-philosopher. To know ourselves is essential to all human attainment and self-control; while the proper study of mankind is certainly *man*. But how are we to acquire such knowledge save by a close scanning or critical scrutiny of God Himself through an investigation of His laws, *i.e.*, the laws of nature. Many of these laws are known to us and their method of work fairly well understood and their ultimate consummation appreciated, and yet we fail in many instances to take advantage of our knowledge and then wonder why the outcome of certain events is as it is.

This is notably true in the propagation of the human species. Not that we fail to recognize that reproduction results from the union of cells, for, in a measure, we are guided to this through a purely animal instinct, and even in the choice of cells which is to result in the reproduction of kind, the impelling force is, as a rule, still instinctive or animal rather than intellectual. But we do fail to recognize that the immutable law that like begets like is as potent in the human species as it is in the lower animal or vegetable. On the intelligent choice of cells, therefore, the eugenist bases his plea for rational selection.

Eugenics being a relatively recent study, the pendulum is swinging rather rapidly and reaching greatly diverse positions. Most of the study, up to the present moment, has been based entirely on heredity, with the consequent note of fatalism. Those students of the subject, however, who, I think, have looked at the matter more conservatively, recognize the vast importance of heredity and yet give due consideration to the part played by environment in the development of cells and their determinors. We know that only an oak can grow from an acorn, but on the kind of soil, the climatic conditions and the environment generally depends the kind of oak, *i.e.*, the finished product. Therefore, regardless of what kind of cells with which we are dealing, whether vegetable or animal, the kind of finished product must depend on the nature of the cells (inherent) with which we start and their development through subsequent and outside influence. These influences in the main are of two kinds—good and bad—and one usually is stronger or, at least, more potent in its action and influence. This results in the superior development of one set of cells over another, allowing a certain portion to remain latent or dormant. These dormant cells are by no means dead, but are frequently capable of being aroused into action by accidental or momentary stimuli. In the light of this conception may be explained, biologically,, temptation on the one hand and sudden acts of heroism and even unusual manifestations of genius on the other.

That eugenical idealism cannot be attained in a short period of time is manifest, yet the hope of ultimate success is strengthened in the recognized awakening of thinking men and women. How far we can go in the selection of cells is, at present, an open question.

The marriage license should certainly, even at once, be accompanied by a certificate of health embracing freedom from active venereal disease or tuberculosis and freedom from inherited taint of feeble-mindedness. Beyond this point I believe we cannot yet go. The public will recoil at the idea of mating on a purely intellectual or rational basis; because sentiment is a strong and useful characteristic of the human mind.

The improvement of the human stock can be accomplished through two great measures—legislation and education. Legislation is so dependent on the education of the people as to the importance of health and virility in a nation that, in reality, through education alone may be seen the ultimate solution of the problem. Through sane and conservative legislation, however, we should be able to prevent marriage among the manifestly unfit, both physical and mental. The physically unfit may include, as already suggested, those suffering from active venereal diseases, whereby their direct transmission to the mate may be prevented, but also the transmission of either active lesions or latent taints which may result disastrously, at a later period to the offspring; the tuberculous, alcoholic, openly immoral (probably mental defectives) and the feeble-minded.

In regard to the feeble-minded the law should certainly require segregation at least, in the home if preferred by those who are able to supply the proper care for those afflicted, but preferably in proper institutions; the latter should be compulsory where home training is impossible. The feeble-minded call for our most careful supervision for very many reasons; they are exceedingly prolific; illegitimacy is very common among them, and from their ranks are recruited a large percentage of the habitually immoral.

The question of the method of control is at present a debatable one, whether by sterilization or segregation. Sterilization will prevent reproduction, but will not prevent immorality and the consequent spread of venereal disease. Perhaps a combination of these methods will prevail.

However much laws are passed, public sentiment must be aroused as to their necessity and in order to back up the laws. Only through a general educational campaign can this be brought about.

It is hardly likely that a great deal can be accomplished in less than a generation and by that time those of us of the present generation will have passed out of the control of affairs and others will have taken our places. Our aim, therefore, must be to educate the generation which is coming on to take our places.

Our best opportunity lies manifestly in the schoolroom; here we can implant the principle of eugenics when the mind is pliant and receptive, during the formative years of life, and so implant these principles that they will become just as inherent as honesty, patriotism, veneration and other desirable characteristics.

The child is taught history, political and militant, and yet is kept in ignorance of the effects on nations of immorality and bad breeding. He is taught patriotism through a respect for the flag, a regard for law and protection from an invading enemy, and yet that patriotism which means better citizenship, health conditions and all that makes for virile manhood is neglected. Is it not time that the instruction of the youth of our land was broadened, and is not the wonderful school system of the country the very opportune channel through which to work for the future improvement of the nation? Why should we neglect the most potent of all factors, the education of the children who are in a short generation to be the mothers and fathers, and in the seats of government?

Biology should be regarded as a fundamental just as much as the three "R's," for only through biology can be taught the laws of nature by which the race is propagated, the conception of cells and cell plasma, and that they are of two kinds—good and bad; that through certain determinors and their development are character and health established; through biology can the child best be taught sex relationship in a delicate manner and entirely within the bounds of propriety, and thus be fully prepared gradually for knowledge which comes to him more or less abruptly and from sources which are rarely wholesome but rather vulgar and suggestive.

The child at this age must also be impressed with the moral wrong done in bringing unfit offspring into the world. This should be taught as a fundamental principle and in such a way as to be incorporated into the whole make-up of the individual. The far-reaching effects of the various diseases, not only directly on the individual, but also their effects when transmitted to the next generation, should be told in plain terms without reserve or prudery and yet without suggestiveness. The importance of personal hygiene should be so thoroughly taught that it becomes a habit to such an extent that no other than a hygienic life would be considered.

The various forms of domestic science should form a very considerable part of the school curriculum, not only because of their importance in every-day life, but because right living in the home, which can be taught more effectively in school than elsewhere, is a potent factor in the problem of eugenics.

By far the most vital part of domestic science and the part at present most neglected, however, is the nursery. Most young girls enter into the marriage relation entirely unprepared in mind or body for what lies before them; become mothers, the highest office in life, without having the faintest idea of the care of the infant, with the result that many of them learn the proper care of children at the expense of the life of at least their first born. Why should not the care of infants be incorporated into a course in domestic science? The public school system should be the pioneer in such a movement and thus serve the cause of eugenics as it can be served in no other way.*

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* The Author recognizes the wonderful work done by the city of New York through its "Little Mothers' Leagues." This is merely a plea for the uniform introduction of this form of instruction in all school curricula.

SOME UNUSUAL PHASES OF CHILD HYGIENE.*

BY MARY SUTTON MACY, M.D.,

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Child hygiene is a very large topic, and, as I endeavored to point out last September at the Fifteenth International Congress on Hygiene and Demography held in Washington, one that is too little considered as a real entity separate from school hygiene and other subdivisions of the general science named for the goddess of health. There are, however, certain phases of child hygiene apparently so consistently and persistently ignored as to constitute a genuine danger to the progress of the race, as well as to the health of the child, and it is to some of these that I desire to attract your attention for a few moments to-day.

We hear considerable from psychologists and others—infected by what I am tempted to call "psychologitis—about mental hygiene of childhood, and from certain sources within the last few years we have heard and read, almost *ad nauseam,* much about the mental and nervous effects of sexual psychic trauma in infancy and childhood. So violent has been the epidemic of Freudism in this country recently that the perfectly good term, "psychic trauma," is in danger of becoming restricted in its meaning to the sexual character, so prominent in the present expositions of the Freud school.

One of the unusual phases of child hygiene to which I would call your attention is that of protecting the growing child—not only the infant, but also the youth, the pubescent and, above all, the adolescent--from the ill effects (physical as well as mental) of psychic trauma, which are not by any means all sexual.

It has been my fortune—or misfortune—recently to see a fairly large number of cases in children from ten to eighteen, initiated by a psychic trauma, which so closely simulates a beginning Basedow's disease as to be indistinguishable from it, and yet most authorities on Basedow's disease place its maximum chronological appearance at a much later date. It has also come within my recent experience to have some cases of well-developed Basedow's in adults with histories pointing to earlier occurrences of the diagnostic tachycardia and tremors, usually between the fourteenth and eighteenth years, following immediately upon some mental—occasionally, too, mental and physical—shock to the individuals during their early adolescence. In none of my cases has the initial shock been in any way sexual, though, in one at least of the adult cases, there has later appeared a superimposed hysterical synthesis of a sexual nature which arose from a sexual trauma of quite recent occurrence compared to the Basedow's history, and for which no psychoanalysis I have been able to obtain gives any infantile history for a basis.

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* Read before Section on Mental Hygiene, of the Fourth International Congress on School Hygiene, Buffalo, New York, August 28, 1913.

Recently, also, there have come under my observation about 30 cases of chorea having a history of psychic trauma, in no way sexual, as the point of origin for the really neurotic symptoms. I do not wish to suggest that I consider a nervous shock as the sole origin of chorea—nor for that matter of Basedow's disease—but I do wish to call attention to the contributory effects thereof in initiating both of these nervous conditions and to sound an alarm that the child hygienist may heed in helping to prevent the nervous and psychic trauma of school life.

Perhaps a few words here on what I should like included in the understanding of my use of the phrase "psychic trauma," would serve to make this paper more helpful in a Congress on School Hygiene. I have already protested against the restriction of its use to the sexual trauma, though they of course, within limits, do play an important rôle, but to me psychic trauma is an inclusive term, embracing all nervous shocks which temporarily or permanently, suddenly or slowly, arrest or retard mental processes or trains of thought. Under such a definition the term includes acute shocks from fright, anger, grief, joy, fear, etc., and also more—may I say—"chronic" shocks from repeated disappointment, from psychic strain of mental fatigue due to physical inefficiencies, such as result from undetected or uncorrected defects of vision, hearing, etc., and other contributory physical causes of retardation.

Both the morbid conditions I have cited, *i.e.*, Basedow's and chorea, are prone to appear in children of more or less markedly neurotic temperaments, if not also of neurotic heredity. Some one has claimed that the neurotic temperament—as contrasted with the phlegmatic and the sanguine—is the temperament that rules the world. Our school curricula often appear based on this theory with the added belief—not always in the background—that the nervous temperament will stand a deal of pressure. We frequently hear it said, "The type is so wiry, resistant and strong, even though somewhat delicate in appearance"; and so the tendency arises to overcrowd or to keep the child supplied with all the new mental pabulum he seems capable of absorbing, regardless of the correlations which should exist between mental and physical development, on the theory that the nervous temperament, if it is to rule, must be broadly educated on a wide range of topics.

If this policy of our schools, *i.e.,* to crowd the curriculum and press the children forward as fast as they can be forced, is really a fact and not only an apparent effect, it is to be strongly condemned, because it is not only a detriment to the immediate health of the children, but it is also a danger of no small consequence to the nation, since it tends to produce mental and physical inadequacy and faulty balance in the future fathers and mothers of the nation.

Chorea has long been considered a disease of childhood and authorities are still lacking in unanimity as to its true cause, as well as to its treatment, but surely we, as a people, should be intelligent enough to acknowledge the danger of maintaining any system which yields a patently contributory cause to its production.

Basedow's disease, on the contrary, has been considered a disease of adult years, though my own experience leads me to consider it a disease of late puberty or early adolescence. with a tendency to subsequent periods of latency and recurring exacerbation.

Both diseases are aggravated—if not more or less indirectly caused—by psychic trauma, either acute or chronic. Therefore, in my opinion, it behooves us to be on guard to prevent all obvious causes of nervous strain and irritability which lie within the control of our public school authorities. It is an unfortunate fact that the majority—if not a practical unanimity—of those in immediate charge of our schools to-day are absolutely unintelligent on the vital subject of caring for the health of the child.

Medical school inspection—where enforced—has done much to abolish epidemics and control the morbidity from contagious diseases; it has done practically nothing to control the morbidity and to prevent disability from such preventable causes as overpressure, crowded curriculum, and nervous strain during puberty and early adolescence; and it has done very little—and that only in the most wide-awake centers—to obviate retardation from preventable or remediable physical defects and inefficiencies.

It is my opinion—after a number of years' observation and careful study of this problem in several countries, as well as various parts of our own country—that the prime cause of this lack of results on the part of medical school inspection is largely lack of intelligent coöperation between authorities and lack of education.

In New York City much energy is constantly being wasted through the bickering and ill feeling arising from division of authority. Medical school inspection is under the direction of a very efficient Child Hygiene Department of the Board of Health, but there is little or no coöperation in fact—though there is theoretically a perfect system in coöperation—in the schools between the principals and teachers under the Board of Education and the physicians and nurses under the Board of Health. The former blame the latter, and vice versa; the heads of the school system put the blame on the divided authority; the heads of the Health Department claim that the school authorities do not insist on coöperation, but offer destructive, not constructive, criticism of the work done, and that the working staff reflects the attitude of the superior authority. Be this as it may, a recent episode shows a similar attitude of unwarranted criticism in the Department of Health Division of School Hygiene. For seven years a most excellent constructive work for the medical and school care of nervous and mentally defective children has been conducted under the Board of Education. Recently the Board of Health examined children in many, if not all, these special classes and declared that there were children there who were not mentally defective and also offered further criticism of the medical work done or undone in this field; all this on the strength of one series of examinations of children in the classes, and regardless of the problems facing that department of the Board of Education in the general school system; also, in the face of the constant claim put forth by the Child Hygiene

Division of the Department of Health that their appropriations from the city are insufficient to provide an adequate force for the examination of *all* children in the public schools. The question naturally arises, therefore, in the mind of the outsider, "Why this gratuitous work of criticism and duplication of medical work done, and, admittedly well done, by the Board of Education?" So it goes, the blame for the inefficiencies in the real work in New York are laid to "division of authority," but a brief glance at any other number of places where such division of authority does not exist gives us similar results. The contagions are brought under control, the physical and mental deficiencies are causes of anxiety and inefficiency in the health work and in the school work, the results of strain—nervous, mental and physical—are obvious and unchecked, and either the schools or the medical inspection, or both, are unsparingly criticised and scathingly declared incompetent.

The facts, as my experience shows me, are these: The medical inspection system is as competent as unintelligent medical inspectors and nurses can make it; the school system is as competent as unintelligent teachers and supervisors can make it, but is there any real excuse for this widespread unintelligence lasting into the future, or for its existence to-day?

Medical inspection in schools is comparatively a new thing, and it was to be expected that the early doctors interested in it did not know anything about the theory and practice of pedagogics and kindred subjects of the science of teaching, but we have no adequate excuse in these enlightened days for placing the medical inspection of our schools in the hands of fresh and inexperienced medical graduates, who know little or nothing of genuine practice—even if chuck full of theory—of the science of medicine, and much less of the science of education.

Scientific education of teachers for their vocation is also somewhat a new thing, but it, assuredly, is old enough for some appreciation to have arisen in the mind of educators that the teacher must know something of the child as well as the subjects to be taught the child. As evidence of this, we have in our normal schools and colleges courses in psychology and in child study, but alas! we are still inexcusably lacking in courses in child hygiene and practical physiology.

When teachers and principals and educators generally know more—and know it practically—about the child to which they have to adapt the workings of their scientific theories of education; and when the physicians and nurses who have medical school inspection under their supervision know more, and know it by practical experience as well as by theory—about the science of education to which they have to adapt their knowledge of the child and of disease and disability prevention, then we will have not only a more ideal medical school inspection, but also a more ideal curriculum, less nervous strain and consequent psychic trauma with their resultant ills to the children, and will hear less—much, much less—about the inadequacy of the schools and of medical inspection, and we will find that mutual recriminations between Boards of Health and Boards of Education are things of the past. Let us all coöperate to such an end, and begin by insisting on a higher standard of educational requirement for the doctors and nurses, as well as for the teachers and principals, who have under their direct control the hygienic and pedagogic care of the nation of the immediate future.

101 West 80th Street.

QUINCKE'S DISEASE.—In *La Presse Médicale* for February 22, 1913 (*Glossaire,* p. 216) angioneurotic edema is described, in honor of Quincke, who first distinguished it, in the *Monats. für Prak. Derm.* (July, 1882) as a syndrome characterized by the appearance of circumscribed edemas of fugacious and recidivist tendencies. Sometimes hereditary or familial, it is met with usually in the first half of life, and generally in those subject to nervous and dyspeptic ailments. Probably it is a manifestation of anaphylactic sensibilization to various toxic though commonplace influences, resulting not only in passive exudation, but in active secretion of the vascular endothelium (Feuillet, *Thèse de Paris,* 1910). Treatment is sufficiently unsatisfactory, but the nervous and alimentary factors must be counteracted as far as is possible; and belladonna, with sometimes digitalis, may be used to induce vasoconstriction at the times of stress. The edematous swellings are very apt to attack the face, but the various mucous membranes are often involved, and the larynx may be so violently affected that tracheotomy is required.

PICRIC ACID AS AN AID IN THE TREATMENT OF VARIOUS SKIN LESIONS

BY HERBERT B. WILCOX, M.D.,
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Picric acid first came to be applied surgically through its action as a coagulant of albumin. This characteristic of the drug was noticed in the process of tanning skins, and later on was applied to the preservation of microscopic sections.

A search of the literature on the subject shows that the drug has formerly been extensively used, but of recent years less frequently employed. In 1876 Cheron reported that picric acid encouraged the cicatrization of wounds, arrested fermentation and dried up morbid secretions. Fifteen years later Thiery presented an excellent report on the results of picric acid in saturated solution, in the treatment of ulcers, granulating wounds, excoriations, a variety of skin diseases, urethritis and in particular in the treatment of burns. This work, with that of Grange, placed picric acid in the dermatologist's formulary. It then began to be used largely in the treatment of eczema. Carelli and Cerassi also found the drug useful in eczema, erythema, artificial dermatitis, impetigo and erysipelas. The striking results obtained in 2 cases of severe burns, to be later reported in detail, suggested the use of the drug in a variety of skin conditions with results that seem worthy of attention.

Picric acid is a tri-nitro-phenol, discovered by Haussman in 1788, and demonstrated by Laurent in 1841 to be a phenol derivative made by dissolving phenol crystals in sulphuric acid, and then adding nitric acid. It is soluble in alcohol to 10 per cent.; 20 per cent. in ether; 1.2 per cent. in water. Its absorption by the body, in amounts likely to result upon the ordinary usage of the drug, even over large areas, does not result in permanent damage. If absorbed abundantly by the skin and alimentary tract, there is produced a bright yellow staining of the skin, mucous membranes and urine. Prolonged absorption may result in parenchymatous inflammation of all the body organs with disintegration of the red blood cells. Erb found that 8 grains administered internally caused severe gastroenteritis and prostration in the rabbit.

There is no simple quantitative urinary test for this drug. The degree of absorption may be with some accuracy determined by noting the amount of stain by the urine on cotton which has been dipped in it.

In testing picric acid against bacillus pyocyaneus and staphylococcus aureus, Ahrenfried demonstrated that 1 per cent. picric acid has fifty times the bactericidal power of a 1 per cent. carbolic acid solution. A year's experience on Dr. L. E. La Fétra's service and the out-patient department of Bellevue Hospital, in the treatment of burns, psoriasis, impetigo, acute and chronic eczema, ringworm, erysipelas, intertrigo and accidental skin excoriations, by picric acid, has shown it to be a very useful drug. Among the striking effects are the prompt relief of itching, stinging and pain—that is the anesthetic effect of the preparation; its antiseptic action in rapidly cleaning up superficial infections; its coagulating, protective action on the skin—in this way obviating maceration of the parts about the lesion and generally increasing the skin's resistance; and its easy application, which may be in aqueous or alcoholic solution, painted on, by wet dressing, or by ointment.

In the use of picric acid solutions for the sterilization of operative areas it was found (O. W. Mitchell) that a liquid solution will pass through rubber tissue in a very short time. Other experiments upon the osmotic action of picric acid solutions showed that it easily penetrated mesenteric membrane, skin and muscle tissue, and retained its germicidal activity after such passage. This evidence of the penetrating qualities of the drug raised the hope of some success with its use in erysipelas.

Schamberg and Coleman report their results in the treatment of vaccination wounds with picric acid. They conclude that its use in no way interferes with the specific action of the vaccine; that if constitutional symptoms were likely to ensue upon vaccination these were lessened or avoided when picric acid was used; that the local reactions were of much reduced intensity; and that the course of the proceeding was materially shortened.

Eczema.—Better results were obtained in the acute than in the chronic eczemas; most striking was the improvement seen in the facial cases having profuse exudation, excoriation and crusting. In the milder cases an aqueous solution painted on several times daily and allowed to dry was used, while in the more severe cases wet dressings of picric acid were applied, held in place by a facial mask. Lessening of the itching, and pain attendant upon the inflammatory condition was almost immediate. Reduction in the serous exudation and softening of the crusts were equally prompt. Improvement in the induration was rapid, as was the subsequent epithelialization. Such a rapid relief of the suffering attendant on this distressing condition was not obtained by any other means.

Picric acid alone was not as efficacious in the subacute and chronic types of the disease; it was found, however, that the curing of the lesions was hastened materially by treatment initiated by two or three days' application of the picric acid solution. The effectiveness of the usual ointments, containing zinc, tar, salicylic, calomel, mercury, etc., was much greater with than without this preliminary treatment.

CASE I. A baby of sixteen months, who had had two previous attacks of facial eczema, each lasting about two months in the acute condition, and never altogether clearing up, when first seen, had had for three months a severe weeping eczema of cheeks and forehead, with marked edema of the lids and of the glabellar region. After eight days of wet picric dressings the skin was entirely normal.

CASE II. A particularly severe case of eczema of the buttocks and genital region, which had resisted treatment with ichthyol and zinc ointment for one month, was practically cured after two days of picric acid dressing.

CASE III. A child of two months, suffering from a papular-sudaminous eruption of the buttocks, edematous condition of the adjacent skin, and a papulomacular dermatitis with infiltration of the skin of the cheeks, presented a normal skin after seven days' treatment by painting with picric acid solution.

Burns.—The use of picric acid in the treatment of burns is too well known to bear repetition here, but results that seem exceptional, obtained in 2 severe cases, may briefly be cited as examples of the efficacy of this treatment in preventing destruction of, and paving the way for, the rebuilding of injured tissue. A child of seven years was burned to the third degree from the waist line to the toes of the left lower extremity in almost its entirety, with only small islands of first and second degree burns occurring in the popliteal space, groins and calf. There was a burn on the corresponding area of the right side, about one-half first degree and one-half second degree. Although the skin and subcutaneous tissue sloughed away from the entire left leg, exposing the bone in places around the ankle and foot, a complete epithelialization was obtained without skin grafting, and function of the limb was restored to its normal condition.

Another patient, five years old, sustained third degree burns of the left side of the thorax, flank, buttocks and upper half of the thigh. This area also was induced to heal completely without skin grafting and with only a small area of cicatricial contracture in the groin. In the first case, a private patient, the picric acid was applied as a wet dressing within a few hours of the injury. There was a prompt relief of the pain, which never returned; there was surprisingly little shock and no secondary infection of the burned area. It is fair to assume that without the preserving and protecting action of the picric acid the islands of epithelial tissue, necessary for the recovery of the leg without grafting, would never have been preserved; and that without the anesthetic effect the patient would not have withstood the shock attendant on such extensive injury. The second child was a hospital case, who came to us some weeks after the injury in a pitiable condition. The burned area was bathed in pus; temperature high; emaciation and prostration extreme. Wet dressings of picric acid quickly disinfected the damaged area; the temperature reduced on the third day and soon came to normal; the child began to sleep and eat well and had made some gain in weight at the end of the first week. Complete recovery of the denuded area also occurred in this case without skin grafting. Several minor burns of face and extremities were treated with picric acid and with universal relief from pain.

Intertrigo.—There was uniformly rapid and satisfactory improvement in every instance in which this disease was treated with picric acid. The solution was painted on the surfaces of the skin involved and they were kept from coming into contact by thin layers of absorbent cotton. In the more severely infected cases wet dressings were used. Cures were effected in about half the time taken on similar cases treated with ichthyol solutions. The use of picric acid in intertrigo was so satisfactory that a bottle of the aqueous solution is now part of the regular equipment of the dressing carriage, and the nurses, in the routine of changing the babies' napkins, apply it whenever the buttocks appear red or irritated.

Erysipelas.—Results in the treatment of erysipelas were not uniformly successful. In certain ways they were, however, more satisfactory than the results obtained by the use of any other method. The discomfort and pain attendant upon the condition were relieved more quickly and the edema disappeared rapidly. In several cases, desquamation in cast-like masses followed the use of picric acid, leaving a healthy normal skin beneath. A reduction in the temperature in these patients was the rule, occurring with or without marked improvement in the local condition.

Herpes Labialis.—A more rapid drying up of the lesion and fewer extensions of the trouble were obtained with picric acid than with any other method used.

Ring Worm.—Ring worm of the scalp responded no more rapidly to picric acid than to other methods of treatment. Body ring worm was more easily controlled by the painting on of picric acid solution than by the use of the usual antiseptic ointments.

Psoriasis.—With the exception of immediate and constant relief from the itching, children suffering from this disease showed no particular response to the treatment.

Impetigo.—Better results were obtained with the use of antiseptic ointments than with picric acid washes. Picric acid ointments were not used on these cases. It may be that applied in this form the results would have been more satisfactory.

Vaccination.—Only a few cases of vaccination were treated with applications of picric acid. Those that were so treated from the start ran a normal course, did not become infected and gave very little local reaction. Several badly infected vaccinations treated in this manner made surprisingly rapid cures.

In conclusion, it should be stated that the use of picric acid for the foregoing conditions is not suggested as a new method of treatment. It is a method which was well known and much used some time ago, which, however, has fallen into disuse in recent years. As an aid in the relief of discomfort attendant upon skin lesions and in the production of a cure in them, picric acid has proved its worth, in some cases being almost a specific and usually of very great assistance. The danger of untoward results by absorption is negligible. The drug is safe and easy to handle, the only drawback being the permanent staining of everything with which it comes in contact.

159 East 70th Street.

MISCELLANEOUS.

SUPERSTITIONS AND PREJUDICES WHICH HAMPER THE WORK OF THE SCHOOL INSPECTOR.

Among the many difficulties encountered by the inspectors and nurses of the Health Department when urging parents to have the various physical defects found in school children treated or corrected, the numerous traditions, prejudices and superstitions existing among the different elements which go to make up the population of our cosmopolitan city stand out prominently.

When the inspector or nurse suggests that an operation or other treatment be instituted, some racial or religious prejudice or superstition will frequently be raised against such intervention. When glasses are suggested for defective vision, they are often told that eyeglasses are a luxury, that they make the child look old, that they are worn for style, that the child will get used to them, that they will become a habit, that they will cause the eyes to grow weaker, or that they will interfere with the matrimonial chances of the daughter. When the parents are informed that the children do not hear well as a result, perhaps, of running ears, the inspector is informed that this discharge allows the poison to escape and thus purifies the blood, and the statement is frequently made that at home the child hears too much. Difficulty of breathing due to enlarged tonsils and adenoids results in the doctors and nurses being told by various elements of the population that God put the tonsils and adenoids there; that if the tonsils are removed, the throat will be too wide and air will rush into the lungs, subjecting the child to inflammation of the chest; that removal of the tonsils will interfere with the speech, the singing voice and the procreative power, or that the children will become nervous and depressed, possibly with suicidal tendencies.

Voodooism is quite frequently met with amongst the Negro population, and cases have been encountered where different colored yarns have been employed for the cure of contagious and other diseases of the skin and eyes.

A request that hair matted by dirt and lice be cut frequently brings the retort that to cut the hair will prevent the growth of the child and diminish its strength. A request to have the defects of teeth remedied meets with the statement that pulling the teeth gives the children sore eyes; that it is bad luck for any poor child to have gold or silver in the mouth, or a mother will exhibit her toothless jaw and say, "I haven't any teeth and still I am alive." The "evil eye" is guarded against in some sections by the mother hastily licking the child's eyes and face, expectorating while she does so, or by sewing some salt in the child's shirt or by tying red ribbon around its wrist or neck. The weakness of the child's memory is frequently attributed to the fact that the child eats the ends of the bread loaves, while bed-wetting is not uncommonly ascribed to the fact that the child always plays at the fire or with matches before he goes to bed.

Among some of the people wine, beer and coffee are considered as tonics and used to strengthen the child. Many mothers call their children to task for describing how a neighbor's child was operated upon, fearing that a similar operation will be performed upon their own.—*Weekly Bulletin, New York City Department of Health.*

FATAL HEMORRHAGE FROM THE THROAT.—J. D. Rolleston describes an uncommon cause of death in a child of six from asphyxia caused by entrance of blood into the air passages (*British Journal of Children's Diseases,* February, 1913). The child was suffering from ulceration of throat and uvula; no diphtheria bacilli or Vincent's organisms were found. She had suffered five weeks earlier from measles. A few days after admission to hospital she gave a cough; a huge gush of blood poured out of her mouth and the girl died in five minutes. At the postmortem abscess cavities were found in both tonsils, with ulceration of the uvula, soft palate and neighboring tissues. The exact site of the bleeding vessel could not be ascertained. This case should be regarded as an instance of ulcerative sore throat, to which the name pseudodiphtheria has been applied. The hemorrhage probably came from the laryngeal portion of the pharynx.

SOCIETY REPORTS.

NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, Held October 17, 1913.

HENRY D. CHAPIN, M.D., CHAIRMAN.

ATYPICAL INFANTILE PARALYSIS.

DR. F. L. WACHENHEIM.—One of the striking features of the present epidemic of infantile paralysis, which has prevailed since 1907, is the large number of atypical cases. The classical form of the disease runs the following course: The child suddenly falls ill with moderately high fever, more or less marked gastrointestinal disturbance, and general weakness of the extremities. In a few days the fever abates, leaving the child paralyzed in one or more limbs. This paralysis gradually passes off, except for one group of muscles, usually in one of the lower extremities, which atrophies and remains disabled for life.

Infantile paralysis was formerly considered a disease of the anterior horns, usually of the lower spinal cord, rarely involving other portions of the gray matter, with the exception perhaps of the polioencephalitis of Wernicke and Strümpfell.

During the epidemic of last fall I observed 7 cases, only 1 of which was typical. The others were so atypical as to be worth reporting. In the first of these cases the child had been ill for several days with a temperature up to 106°F. The prognosis seemed doubtful as to life and poor as to the possibility of a restitution of the impaired muscle. This child made a rapid and complete recovery save for a slight weakness in the left leg.

In the second case the child was practically comatose when I first saw it. The reflexes were almost absent in the lower extremities, and otherwise nothing precise could be elicited. In a few days the child's mental condition became normal, but one deltoid muscle showed some paralysis. Patients suffering from the cervical form of poliomyelitis were especially subject to involvement of the gray matter of the medulla oblongata and basal ganglia, and possibly also of the convexity. Deep somnolence was a characteristic and alarming feature of this group of cases. Many authors insisted that the cerebral affections associated with poliomyelitis did not affect the cortex, but the frequent grave disturbances of the sensorium were strong evidence that the cortex was sometimes involved. The most significant feature in the clinical history of the third case was a profuse local sweating limited to the face, with a normal body temperature. This phenomenon persisted for a number of days in diminishing degree. This case was clearly one involving the uppermost portion of the cervical cord, with special implications of the origins of the spinal portion of the spinal accessory nerve, in itself a rare type. A search of literature has revealed no similar instance of facial sweating. General hyperhidrosis might well be attributed to a disturbance of the sweating center in the medulla oblongata and was therefore especially likely to occur in cases of the cervical cerebral types. In this case the local sweating was probably in relation to the facial paralysis, which was present in the early stages of the disease. The involvement of the sensorium was unusually marked in this case and I suspect that the medulla oblongata was actually slightly involved.

The third case was a typical one of polioencephalomyelitis with the main lesion in the pons; it presented no features calling for special comment, except the site of the inflammatory process, which we no longer regard as a great rarity. The striking feature of the fifth case was the prolonged subfebrile temperature with tachycardia, lasting seven weeks. There was no doubt but that in this case the involvement of the gray matter was unusually extensive, and it was therefore not impossible that this patient suffered from grave impairment of the cardiac innervation. This child, after being discharged from the hospital, was readmitted suffering from symptoms of bronchopneumonia and succumbed to acute dilatation of the heart. It is well known that a fatal paralysis of the diaphragm, caused by a lesion in the center supplying the phrenic nerve, was not excessively rare in poliomyelitis. It is among the possibilities that the present case may be assignable to this group. The symptoms in the sixth case were strongly indicative of meningitis and the differential diagnosis was made on the following points: Cerebrospinal meningitis was excluded because of the preponderance of lymphocytes in the cerebrospinal fluid, the absence of meningococci, the rapid recovery from the uncommonly severe posterior basic symptoms, and the absence of an epidemic at the time. Tuberculous meningitis was excluded by the high leukocyte count, the acute onset, the favorable outcome and the negative v. Pirquet reaction. The other forms of meningitis, such as are caused by the streptococcus, the pneumococcus or the influenza bacillus, would show the respective germs and would end fatally; one was therefore safe in excluding them. On the other hand, all extant postmortem records show that poliomyelitis is always accompanied by more or less severe meningitis. It is usually of a mild type, but may be sufficiently intense to cause characteristic symptoms for days or weeks, and may even occasionally end fatally. While I cannot find another case presenting optic neuritis, as did this one, and terminating in atrophy and amaurosis, such an occurrence is readily conceivable.

It seems that the Fehling test is of doubtful value in severe cases of meningoencephalitis, seeming to vary according to the intensity of the infection, rather than the etiology of the disease.

A characteristic feature of this group of cases is the acute onset, differing in this respect from tuberculous meningitis, but resembling the meningococcus type. The high leukocyte blood count seemed to be a constant feature of this group, differing from the findings in ordinary poliomyelitis. The cerebrospinal fluid was at first cloudy, but differed from that of cerebrospinal meningitis in that the sediment consisted chiefly of leukocytes; in a few days the fluid cleared up, leaving only a delicate fibrin on standing. It may be that the germ of poliomyelitis will be found in the spinal fluid of these cases. The intraspinal pressure is usually not high, far lower than in the usual forms of meningitis. The temperature is apt to run the course usually observed in poliomyelitis, rather high at first, but falling to normal before the remission of the grave cerebral symptoms. The most striking feature in this series of cases was the disproportion between the cerebral symptoms and the general condition of the patient. One of the cases in this series not only held its own, but the child, after the first few days, actually showed a gain in weight in spite of the apparently serious intracranial condition. This clinical discrepancy was so remarkable that it cannot help to attract the attention of the attending physician and clear up all doubts as to the type of the disease. The prognosis in this type of disease is fairly good as to life, still unfortunate after-effects, as paralysis of some muscular group, mental impairment or amaurosis may remain. The resulting paralyses are apt to be of the flaccid type distinctive of poliomyelitis, not spastic, as after ordinary meningitis. The remarkable variations of this small clinical material are sufficient to convince one that infantile paralysis is one of the most protean affections of the central nervous system.

A YEAR'S PROGRESS IN POLIOMYELITIS RESEARCH.

Dr. George Draper.—I have purposely avoided writing a paper, because my subject calls for a review of the literature and the authors have presented their work much better than I can do. There are three points, however, which are especially deserving of mention. First, in reference to the visceral pathology of poliomyelitis, it has hitherto been thought that poliomyelitis was a disease limited to the central nervous system, but it has now been discovered that there are general lesions. Especially worthy of note is the involvement of the lymphatics and the lesions of the liver similar to those noted in leukemia and other diseases of the lymphatics.

The second point in our progress concerns the epidemiology of the disease. It has long been suspected that the secretions of the nose and throat are the carriers of the infection and this has proved to be the case. In Sweden washings from the rectum of patients suffering from the affection have been injected into monkeys and the disease has been reproduced, though it did not run the typical course pursued in man. The organism has been found in the secretions of the nose and throat of healthy individuals who have been exposed to the infection.

The third point, and what seems to be the discovery of the greatest importance, is the identification of the organism itself. This organism is extremely small, measuring from fifteen one-hundredths to three-tenths of a micron. It is just on the limits of visibility. It is anaerobic and cultivated only with the greatest difficulty in fluid media. After it has begun to develop it can be transplanted to solid media and to agar. Its gross appearance is a slight cloudiness in the bottom of the tube, which has no striking features. This cloudiness gradually rises in the tube and becomes granular, and small culture colonies can be made out. It does not seem to produce acid. It takes the Giemsa stain best of all, is variable to the Gram stain, but tends to be Gram positive, varying, however, with the constituents of the medium. Koch's laws are fulfilled with the organism. With regard to the difficulty of producing the disease from cultures in monkeys, it should be remembered that the monkey is not inherently susceptible to the disease and that the production of the disease with a culture is more difficult than by direct infection, as the virusence loses by passage through artificial media. The interest of the moment is directed not only on the relation of the germ to poliomyelitis, but on the fact that its discovery opens up a new field in bacteriology.

DR. HENRY HEIMAN.—When one considers that there are at least nine varieties of poliomyelitis, it is not surprising that so many atypical cases are found. Dr. Wachenheim's cases would serve as a nucleus for many other types likely to be observed in the future. Scarcely any part of the cerebrospinal system is exempt from attack and this may account for the great variation in the types of this disease. The cerebrospinal and meningeal types of this disease are sometimes confused with meningitis because of the presence of spasticity, but after the subsidence of the spastic signs paralysis appears and the diagnosis is cleared up. It is almost impossible to give a definite prognosis in the severe cerebral forms.

I would like to ask, since the germ is anaerobic, how it is able to live in the secretions of the nose, throat, or rectum.

DR. H. L. AMOS.—Dr. Draper has described the organism of poliomyelitis very accurately. It was only with the greatest difficulty that we succeeded in cultivating this organism at all according to the method of Noguchi. We tried out about twenty-five samples as ascitic fluid before we at last succeeded in cultivating the organism from the nervous tissues of a monkey dead of the disease. The organism has been found in the spinal fluid of a monkey, but never, so far as I know, in that of a human being. We have concentrated spinal fluids from several human cases of acute poliomyelitis under diminished pressure at 33C. and injected it into the brain of monkeys, but suggestive symptoms only resulted. Concerning the viability of the virus I may say that one of our strains has been kept in 50 per cent. sterile glycerin in the ice-box for twenty-four months and is still capable of producing the disease when inoculated into the brain of a monkey.

Dr. George Draper, in closing the discussion, said that they had not yet been able to reproduce the disease with the blood of those affected with poliomyelitis. As to the survival of the organism in the secretions of the nose and throat, it might be that the secretions formed a capsule enclosing the organism and excluded the air and thus preserved the vitality of the organism.

Dr. F. L. Wachenheim.—The points which I wish to emphasize are the difficulty of diagnosis in meningeal cases, and that in a few days one can easily size up these cases as not typical meningitis. The subject of insects as carriers of poliomyelitis has not been discussed and it is to be hoped that it will be brought up later.

RESULTS OF THE INVESTIGATIONS OF SUMMER DIARRHEA AT THE BOSTON FLOATING HOSPITAL.

Dr. Henry I. Bowditch, Boston.—Greater interest is shown in Boston than in most other cities in the bacteriology of summer intestinal diseases of infancy. My remarks will be only an accumulation of the results of the investigation in the Boston Floating Hospital from 1910 to 1913. These facts illustrate the advantages of intensive work.

The Boston Floating Hospital is a small hospital having accommodations for 120 ward and 160 day patients. The children admitted are from one day to seven years old. There is a post-graduate staff of 80 nurses, 16 internes, two bacteriologists, and one pathologist connected with the hospital. The first object of this hospital ship is for the service that it gives the public; in addition, it has attempted to produce scientific results which would be helpful to humanity.

The scientific work was started in 1907, when Dr. William P. Lucas with others studied agglutinins in the blood of dysenteric cases.

In 1910, Dr. Arthur I. Kendall was appointed as first bacteriologist and made, with the staff, an extensive bacterio-clinical study of diarrhea, especially dysenteries. We established a shorter method by twenty-four hours of making the bacteriological diagnosis of the dysenteries produced by the Flexner and Shiga bacilli. We found the gas bacillus was in many cases the predominating organism and then demonstrated a short clinical test for the presence of this bacillus in the stools. This test consisted in taking a tube one-quarter full of milk and inoculating it with mucus from a movement. The whole was boiled for one minute over a Bunsen flame and then kept at blood heat for from six to nine hours. A positive gas bacillus infection peptonizes the milk, squeezes out the whey, riddles the curd with gas, and produces a strong odor of butyric acid.

This same year we shortened the former long period of starvation in dysenteries from three, five or seven days to twenty-four hours. Boiled water was given as temporary starvation. This was followed by barley water, lactose, or buttermilk, according to the infection. We used for the first time this year (1910) a solution of dextrose (2½ per cent. in normal saline) for stimulation in cases of dysentery of the Flexner type, with marked loss of water and depletion. It was usually injected in rather large amounts at first—4, 6 and 8 ounces every twelve hours. The idea underlying this procedure was the following: The normal amount of circulating dextrose in the system had been partially used up, and by supplying the infecting organism with this food it could be prevented from living on the body proteins and producing toxins.

In 1911 we continued this same study. In this year we isolated for the first time the Shiga bacillus from the blood. We made an investigation this year along the line of rectal irrigations, trying various solutions; most of them did little good. We now give saline irrigations immediately on admission and but few during the course of the disease. We used silver nitrate (3 per cent.) in instances where the infection was low. Other solutions like tannic acid had little effect. We found pyelitis was rather frequent in our cases, the majority occurring in cases of streptococcus infection.

The following year, 1912, there was an increase in the number of cases infected with the gas bacillus. We followed out the theory of feeding high proteids, giving buttermilk, fat-free milk, and eiweissmilch without any trouble. After the first week we felt perfectly safe in giving these without making a bacteriological examination. Almost all the children improved under this treatment. Any one of these varieties of milk seemed to agree as well as another. We thus concluded that milks with high percentage of protein were better for gas bacilli infections. We also found that in this kind of infection it was dangerous to give lactose. With the administration of lactose and the reappearance of other symptoms one should immediately change to high protein feeding.

The year 1913 is as yet an incomplete story, but it is interesting as far as it goes. The bacterial findings are now more accurate than formerly. During this year there was a predominance of the slime bacillus; this bacillus first appeared in August, 1912. The bacterial study of these cases during these years seems to show that the predominating bacillus in the month of August will be the predominating one in the following July. This carries out the cyclic phenomenon of epidemic diseases. We used this year high protein feedings during July, because of the presence of the gas bacillus. In August, the Flexner bacillus appeared, and, because of the danger of giving high proteins in such cases, we quickly changed to other methods of feeding, giving 5 to 7 per cent. lactose solutions with or without barley starch.

Cases on the Floating Hospital are at the service of any of the visiting staff. The physicians drawn from the various hospitals co-operate completely and help one another. We held a yearly clinical mid-summer meeting in order to go on with the season's work. This meeting proves most beneficial, and to it all are invited who may be interested.

DR. RICHARD M. SMITH, BOSTON.—As Dr. Bowditch has said, we have paid special attention to the acute diseases of the digestive tract on the Floating Hospital and have tried to separate the cases into groups. We have used the classification recommended by the Pediatric Department at the Harvard Medical School, and have found it a satisfactory working basis. It has served the very useful purpose of making it possible for us to understand definitely what type of condition we mean by the different names given.

We have seen, primarily, three large groups of patients on the Floating Hospital, the first presenting simple digestive disturbances caused by errors in diet, due either to a single constituent of the food or a combination. The diseases in this group are not primarily associated with the summer months, and we have studied them less intensively than the other groups.

The second group includes patients who have more than a simple digestive disturbance. The etiology of this group is not well understood. Apparently, it is not primarily due to bacterial action, neither is it due to atmospheric conditions. There is a small group of cases within this general division which are certainly due to great atmospheric humidity. Whether it will be found on further study to have more to do with the etiology of the whole group than is at present supposed, I am unable to say, but I am inclined to believe that such will be the case. The last group included cases which were true infections and are to be sharply differentiated from the other groups. The organisms responsible for the individual cases vary, but the cases as a whole can be satisfactorily grouped together under the term infectious diarrhea. The type of organism shows a marked seasonal tendency, one type usually predominating in a single summer. The particular organism cannot be absolutely determined by clinical study alone, but must be determined by bacteriological examination. The pathological findings from different bacteria vary strikingly, as does also the response of individual infants to various kinds of treatment. Many of the types of organisms and the corresponding clinical condition are only partially understood, but we recognize several distinct groups, the Shiga, Flexner, and gas bacillus. Further investigation is necessary along the lines outlined by Dr. Bowditch, in order that we may reduce the undetermined organisms to a minimum. We have undertaken our work with no preconceived ideas, but are trying to draw logical conclusions from the combined clinical, pathological and bacteriological study of the material as it has presented itself at the Floating Hospital.

Dr. Rowland G. Freeman.—My first experience in pediatrics having been in the autopsy room, I have always been used, myself, to an anatomical classification. Clinical cases are readily classified in this manner. The lesion is, in most cases, an ileocolitis, only the lower twelve inches of the ileum and each end of the colon being infected, the transverse colon being distended with gas. These cases may be acute or chronic. There may be simply a congestion, or an enlargement of the follicles, or an erosion giving rise to blood in the stools. The mention of the Flexner bacillus has interested me. Some years ago, stimulated by Dr. Flexner, great efforts were made to isolate this bacillus from the stools in hospitals in various cities, this organism being then known as the Shiga bacillus. I had two large services that summer in institutions, and, in studying the results of bacteriological examinations, felt convinced that the Flexner bacillus was simply a terminal infection and had no significance as regards prognosis and treatment. We were not, however, looking for the Flexner bacillus as a predominating organism.

Dr. Godfrey R. Pisek.—The practical bearing in this work presented by Dr. Bowditch, based on a study of a large number of cases studied from day to day and week to week, and, finally, compared to previous years, was that of establishing a specific bacteriologic etiology in some of our cases of diarrhea. It would have been impossible without the coöperation of the clinician, the laboratories and the chemist. They have shown us that in certain cases the bacteriological examination showed the therapeutic indication. The Southerner who comes to our schools to study asks more questions regarding the bacteriology of diarrheal diseases than any other student. He is interested in this phase because he has large opportunities for observing certain types of diarrhea that react differently to the same therapeutic measures. The Boston men are on the right track in their investigation, and we must also conclude that certain types of bacilli are apt to predominate in some localities. Dr. Bowditch has told us nothing of the mortality in Boston. We in New York are rather proud of our statistics. It is well known that we have had the co-operation of the Board of Health, sociological agencies, and an effective educational propaganda, including rational methods of medical management, all of which have effected remarkable results.

For instance, the mortality of infants under one year of age for the year 1906 was 153.7 per 1,000 births. This rate has steadily decreased, until, in 1912, it was 105.3. For the summer months of 1913, there was an actual decrease in the number of deaths of infants under one year of age of 1,620 deaths, or of 28.2 per cent.; the decrease from 1909 was 20.1 per cent.; from 1910, it was 26.1 per cent.; from 1911, it was 10.3 per cent., and from 1912, 5.7 per cent. For the summer months of the year 1912, the number of deaths of children under one year of age was 4,381, of which 1,921, or 43.8 per cent., were due to diarrheal diseases; for the year 1913, the total number of deaths of children under one year of age was 4,119, while the number of deaths due to diarrheal disease was 1,638, or 39.7 per cent., of all the deaths under one year of age.

Dr. William P. Northrup.—I only wish to express my appreciation of the work done by these men during the summer. They certainly deserve a great deal of credit.

Dr. L. E. La Fétra.—Last year I had the privilege of making two visits to the Floating Hospital, and wish to express my admiration of the work done there. All the cases were most thoroughly studied, and the staff conference which I attended was most interesting. From what had been said of the different results of using eiweissmilch on the cases with gas bacilli and on those with the Flexner bacilli, it would seem that a knowledge of the predominating bacilli would be of distinct advantage. It would be interesting to know whether Dr. Bowditch has discovered any characteristic features of the stools, as odor or reaction, that would indicate the kind of infection present.

Dr. Alfred F. Hess.—Dr. Bowditch did not mention the reaction of the stools, a point on which Dr. Kendall originally laid great emphasis. He stated that when an acid reaction was present, one should use proteids, and when the reaction was alkaline, a carbohydrate diet should be used. We have found, however, that, in spite of an alkaline reaction, the children frequently get well with proteid food. I do not quite understand what is meant by starvation of from five to seven days. It was stated that sugar had been suggested, because this substance had partially disappeared from the blood. Is that a demonstrated fact, or a supposition? It is most important to give water in these cases. This may be done by the drip method, using a nipple. A quart can thus be given in a day, and the method has the further advantage of keeping the baby quiet.

Dr. Henry Heiman.—It seems to me that Dr. Bowditch has proved his cases to be infectious diarrheas. We are all acquainted with the Flexner, Shiga and other bacteria as causing specific infections, but these must be distinguished from the so-called summer diarrheas, in which there is no specific infection, in which hundreds of saprophytes may be found, but in which these bacteria play only a secondary rôle. At Mount Sinai Hospital, in the so-called summer diarrheas, examinations for Shiga bacilli were almost always negative. Out of 40 cases examined, there was only 1 in which cocci were found, though Gram negative bacilli were always present. It is my belief that most cases of the so-called summer diarrheas are not due to specific organisms, but to nutritional disturbances with gastrointestinal symptoms, in which the bacteria play only a secondary rôle.

DR. J. FINLEY BELL, ENGLEWOOD, N. J.—The work in the Floating Hospital is most interesting, but it entails elaborate laboratory apparatus, which is not practical in private practice. Probably a simpler method will be deduced.

DR. ROGER H. DENNETT.—I was interested in the therapeutic test of determining the variety of diarrhea with which one is dealing by feeding a sugar solution. Here in New York many of us have been using just the opposite therapeutic test, that of giving high proteid mixtures as a routine in all cases except the acute febrile dysenteries, in which gruels seem to be indicated. Except in the last variety of cases, eiweissmilch and the strong milk and water mixtures seem less liable to do damage and appear more logical. What about using barley gruels, or cooked starches, instead of the sugar solution? Do you consider that starches would take the place of sugar solutions? Therapeutically, there must be some place for the time-honored barley gruel, which has been used for so many years in the treatment of diarrhea.

DR. HENRY I. BOWDITCH, BOSTON.—I did not intend to evade the question of mortality, and while I have not the exact figures with me, I may say that the mortality in 1910 and 1911 was high when the Flexner and Shiga bacilli and streptococcus were predominant. The mortality in the presence of the gas bacilli (1912) was much less, 10 to 20 per cent. This year, 1913, it was low, until August, when it suddenly jumped up, due to a wave of the Flexner bacilli.

Dr. La Fétra spoke of our not using much eiweissmilch last summer, 1912. We were trying to find out what it was that helped these gas bacilli cases; was it the curd of whole milk, or F. F. milk, or was it due to the presence of lactic acid organisms, or mere lactic acid?

Dr. Hess is right in saying that he considered that acid movements are those in which it is wise to give protein, and, when alkaline, it is advisable to give sugars; of course, this reaction must be taken into consideration with the other symptoms. By starvation, I meant starvation as regards food; water must be pressed. It is our practice to give 5 per cent. lactose, or barley water.

Dr. Heiman asked about those cases of diarrhea grouped as summer diarrhea; in the treatment of those cases, there was no sharp rule of procedure. Lactose was usually employed, but barley water might be used in the early stages.

One thing remains to be considered, and that is the greater opportunity for us, as physicians, to get results from groups of cases by co-operative study. We would like this group studied in Philadelphia, New York, Boston, etc., and then we could get together and get something from the results of our observations. One hundred and three cases studied in Boston, the same here and the same in Philadelphia, would amount to something, and it would be a pleasure to work with such groups and to compare and criticise the results of such work.

HYDROCEPHALUS IN A YOUNG CHILD: OPERATION—RECOVERY.—Duncan, in the *Australian Medical Journal* for December 21, 1912, reports this case, aged twenty-two months. On admission, her head bore striking disproportion to the rest of the body, and especially to the face. A crescentic incision was made to the left of the anterior fontanel, the flap turned back and the bone exposed. A medium-sized trephine opening was then made, and a disc of bone removed. The dura was incised and raised, the clear cerebrospinal fluid escaping freely. Twelve strands of No. 2 chromic gut were tied together into a bundle and cut to a length of five inches. With fine sinus forceps one end of this was pushed under the dura, leaving an inch free. This was seized with forceps and bent into the ventricle. The wound was then closed in the usual way. With the exception of a slight rise of temperature, recovery was uneventful. The patient was discharged on September 20th, was re-admitted a month afterward, and found to be in much the same state. It was then decided to ligature, first the right carotid artery, and then, after an interval of fourteen days, the left. She was discharged on the eleventh day after the operation, but was re-admitted a fortnight afterward, and, although such a short time had elapsed, there was no mistaking the improvement that had set in. The left common carotid artery was then tied. The wound, as in the first instance, promptly healed. The improvement increased rapidly, and she was discharged at the end of the third week. Her progress afterward was so rapid that she may be said to have reached, in two months, a normal condition when compared with a healthy child of her age.

THE PHILADELPHIA PEDIATRIC SOCIETY.

October 14, 1913.

THEODORE LE BOUTILLIER, M.D., PRESIDENT.

CHILD WITH CEREBELLAR GAIT.

DR. WILLIAM DRAYTON, JR., showed this girl, aged five years, of Russian Jewish parents, who came to the Orthopedic Hospital, July 30, for marked difficulty in walking. She had a fall, February, 1912, but was not seriously injured. Two days later she had complained of headache and pain back of the knees, was chilly and had a little fever, but seemed well next day. Since this time, her hands "shook" and she had dropped things. Then she began to stagger and fall. Her pain in the legs is worse in damp weather. Examination shows only that her right arm is weaker than the left; doubtful ataxia of arms; staggering, ataxic gait. Wassermann reactions were negative August 8 and October 2, 1913. Upon mercurial inunctions and sodium iodide for a month, she has gained 5 pounds and is able to walk alone. Her gait has become somewhat spastic now. Dr. Drayton considers that she has either cerebellar syphilis, or a cerebellar cyst, resulting from the fall.

DR. E. J. G. BEARDSLEY asked Dr. Drayton if it had been possible to obtain a Wassermann reaction from the father of the child, and suggested that this might prove an aid in establishing a correct diagnosis.

DR. LE BOUTILLIER said that this case resembled one which he had exhibited before the Society last year, in which the symptoms had also appeared after a fall.

DR. HOWARD KENNEDY HILL thought that there might have been hemorrhage following the fall, which was now being absorbed, the improvement following the mercury and iodid.

DR. DRAYTON added that the parents and four other children were living and well. No Wassermann reaction had been attempted in the father.

CONFERENCE OF THE NATIONAL ASSOCIATION FOR THE PREVENTION OF INFANT MORTALITY AND FOR THE WELFARE OF INFANCY.

Dr. J. Torrance Rugh gave some impressions of this Conference. He said that delegates were present from the British Isles, Canada, United States, Australia, New Zealand and India. Meetings were well attended, and were marked by an unusual degree of enthusiasm. The geographical distribution of the papers and the reports of work done and in contemplation indicated that Great Britain is not so far advanced in this work as are other English-speaking countries and was seeking light from the experiences of the others. The inaugural address of John Burns, M.P., was a masterful plea for the education of the growing girl in matters pertaining to motherhood, in the preparation for motherhood and in the care of the child. He also pleaded for public interest in child welfare, and paid his respects in strong terms to those "misguided women, who thought more of politics and pups than of homes and healthy heirs." Papers were read before an administrative and a medical section, in the form of symposia. The subjects of the symposia in the former section were "The Responsibility of Central and Social Authorities in the Matter of Infant and Child Hygiene" and "The Administrative Control of the Milk Supply." In the Medical Section were considered "The Necessity for Special Education in Infant Hygiene," "Medical Milk Problems" and "Antenatal Hygiene." All the papers were terse, forceful and practical. The papers by Dr. F. Truby King, on "The New Zealand Scheme for Promoting the Health of Women and Children"; by Dr. Caroline Hedger, on "The Relation of the Education of the Girl to Infant Mortality," and by Miss Gregory, on "The Improved Training of Midwives as Influencing Infant Mortality," were especially good. That by Dr. Hedger, of Chicago, was one of the most practical presented, and elicited extensive discussion, as well as merited commendation. Because of the lack of supervision of the milk supply, many English pediatrists use dried milks; papers by Drs. Eric Pritchard and A. E. Naish strongly advocated milk powder as economic, sterile and efficient. That prepared by the Bévenot-de-Neveu method was considered best. Dr. Frederick Langmead recorded successful results upon citrated whole milk. In his excellent paper upon "Congenital Syphilis as a Cause of Infant Mortality, and the Preventive Measures Necessary," Dr.

F. W. Mott laid stress upon the control of communicable diseases by reporting to the Board of Health. He advocated salvarsan and neosalvarsan as the best remedies. There is no doubt of the value of such a Conference, and it is to be regretted that the difficulty of language prevents the participation of France and Germany, since their work in this field would doubtless add much more to our working knowledge of these great problems, of such profound interest to nations and countries.

INTERNATIONAL MEDICAL CONGRESS.

Before giving his impressions of the Section on Diseases of Children at the International Medical Congress, Dr. Hill spoke of papers read before the Infant Mortality Conference, held just before the Congress. The establishment of milk depots in increasing numbers throughout Great Britain; new laws requiring all tuberculous cattle to be immediately slaughtered; laws requiring greater precautions by all connected with the handling of milk and against the sale of infected milk, were topics dealt with. The question of radically improving the milk supply, especially in rural districts, where dairies are small, seems to be far from our certified milk standards. The argument was used several times that if milk were made more expensive, even if purer, fewer babies would be able to obtain it and more babies would receive the cheaper and less clean milk. The great advantage of having a milk supply of high standard, which all milk dealers would attempt to approach, thus ultimately raising the standard everywhere, seemed to have been lost sight of throughout the discussion. Instead, there was increasing support of the use of dried milks. The latest process, known as the Bévenot-de-Neveu method, is claimed to leave unharmed the antiscorbutic properties of fresh milk. In favor of its use were mentioned its great cheapness, the absence of bacterial infection, and the fact that pure milk is essential for its preparation. In spite of these facts Dr. Hill felt that our milk supply was steadily being improved and that we should continue to recommend fresh cow's milk as the best substitute for mother's milk.

Dr. Hill then mentioned what had been done since the last International Congress in London in 1881, when Koch's momentous discovery was made known; papers by Professor Paul Ehrlich, on "Chemiotherapy," and by Dr. William Bateson, on

"Heredity"; the splendid address by Dr. Harvey Cushing before the general session, as well as his remarks on internal secretions in a later joint session, describing much of his own experimental and clinical work on disorders of the pituitary body; Professor C. A. Ewald's discourse on the relative frequency of gastric and duodenal ulcers, in contrast with statistics obtained on this side of the ocean; the paper by Professor Schaumann, of Hamburg, on "Recent Discoveries That Have Revolutionized Former Conceptions of Nutrition in Man and Animals," were all intensely interesting to pediatrists. Before the Section on Diseases of Children, the following were among the best papers read: Dr. Harold J. Stiles, of Edinburgh, "The Necessity for a More Thorough Control of the Milk Supply in Combating Surgical Tuberculosis in Childhood"; Dr. Ménard, of Berck-sur-Mer, on the same subject; Dr. John Thomson, of Edinburgh, "Infection of the Urinary Tract with Colon Bacilli"; Dr. E. Gorter, of Leyden, on "Results of Vaccine Therapy"; Dr. Hastings Gilford, of Reading, on "The Effects of the Ductless Glands on Development"; Dr. d'Oelschnitz, of Nice, on "Chronic Suprarenal Insufficiency in Infants"; Dr. F. E. Batten, "Poliomyelitis and Polioencephalitis," with discussion by Sir Thomas Barlow, President of the Congress.

DR. LE BOUTILLIER expressed the thanks of the Society to both of the gentlemen for their excellent reports of these Congresses. He added that he had made some experiments with dried milk, prepared by the Hatmaker process, but was unable to get good results. He fails to see how it can ever replace good clean cow's milk.

FOREIGN BODY IN THE NOSE.—A patient had been suffering for some years with constant catarrh, foul secretion, eczema of the face, enlarged cervical glands, bad teeth and enlarged tonsils, which were ascribed to hereditary syphilis (*St. Petersburg. med. Zeit.*, No. 2, 1913). Hofmann did a tonsillotomy, which gave free air entry to one nostril only, whilst the other continued to have foul discharge, and was prone to bleeding. On passing a sound of a rough body was met, which was regarded as a sequestrum. Under cocain it was removed, and proved to be the upper and much incrusted part of a stud which had obviously been there for years. There was a rapid cure in the local, and great improvement in the general, condition.

CURRENT LITERATURE.

ABSTRACTS IN THIS NUMBER BY
DR. CHARLES E. FARR. DR. C. D. MARTINETTI.

SURGERY.

PYBUS, F. C.: TUBERCULOSIS OF CERVICAL LYMPH NODES. (*Clinical Journal,* London, September 11, 1913, p. 369.)

Pybus' article is rational and well written. He lays great stress on the fact that node tuberculosis is a serious disease and deserves very careful study both as to prevention and to treatment. The cause of tuberculosis of the nodes in the neck is largely milk from tuberculous cows, which causes tuberculosis of the tonsils and from which the cervical nodes are infected. The tonsils may not be enlarged at all; indeed, frequently, if not usually, are not. They are apt to be small and buried, thus escaping discovery. In all cases the teeth must first be put in the best possible condition and then the tonsils should be completely enucleated. If, after a reasonable time, the nodes do not disappear, they should be completely excised. It should be remembered, moreover, that simply opening and draining a subcutaneous abscess will not serve to cure the caseating nodes which are sure to lie beneath. The radical operation is difficult and requires great skill to perform, but the results, although failures are not unknown, more than justify it. One must not lose sight of the fact, also, that there may be other tuberculous lesions associated with the disease in the neck.

CHARLES E. FARR.

GREIG, D. M.: HEREDITARY CONGENITAL TORTICOLLIS. (*British Journal of Children's Diseases,* August, 1913, p. 337.)

Greig reports 4 cases of congenital torticollis in one family, including the maternal grandmother, mother, and two of her four children. The left side of the neck was affected in each instance, and the deformities were all noticed shortly after birth. The second and fourth of her children, a girl and a boy, respectively, are afflicted, while the first and the third, also a girl and a boy, escaped. All the members of the family are well and strong, including the father, who is free from the complaint, and present no other deformities than those mentioned and the secondary changes incident to them. CHARLES E. FARR.

MEDICINE.

WOLFF, G.: TETANUS NEONATORUM, WITH RECOVERY. (*Deutsch. med. Woch.,* September 11, 1913.)

Recovery from tetanus neonatorum is so rare an event that Wolff's case deserves mention. Symptoms first developed on the ninth day, and treatment was at once begun with a large dose of antitoxin injected into the umbilical region. On the succeeding days the injections were made into the muscles or subcutaneously. Chloral in large amounts was given per rectum, sufficient to control the convulsions, and was kept up until the twenty-seventh day. Up to this time gavage was necessary, but from that time on natural feeding was possible and the infant made a perfect recovery. CHARLES E. FARR.

CONCETTI, L.: A CASE OF CONGENITAL MALARIA. (*La Propaganda Antimalarica,* 1912, No. 4.)

The possibility of intrauterine transmission of malaria is generally denied, all recent researches tending to show that the parasite does not pass beyond the placenta. Concetti describes a typical case of an infant two days old who exhibited every symptom of malaria in infants. The attack was treated with euquinin with good results. The parasite could not be found in blood examinations, but the placenta showed evidence in several places of hemorrhagic infraction. The attacks recurred every four days.

C. D. MARTINETTI.

KIDD, FRANK: PURPURA OF THE BLADDER. (*Annals of Surgery,* September, 1913, p. 388.)

Kidd's patient, a girl of twelve, presents the unique condition of a purpura confined to the bladder alone. There was no history of hemophilia, scurvy, or other serious illness, except diphtheria five years previously. The attack began with a sore throat, malaise, sharp, stabbing pain in the left iliac region and vulva, with frequent and urgent urination. Blood was noticed in the urine within an hour of the onset of the pain. The child was anemic and had a follicular tonsillitis with acute cervical adenitis, but showed no petechiæ or other signs of hemorrhage. The urine was full of blood clots and bright red diffused blood. The X-ray was negative for stone and cystoscopy showed only numerous scattered submucous hemorrhages varying in size from a pin's head to a sixpence. There was no ulceration and no sign of miliary tubercles.

The attack was of short duration, but a relapse of two days occurred in about a week, from which the child made a rapid recovery. The petechiæ in the bladder disappeared at once, and, although the von Pirquet was positive, there was no fever, so that a tuberculous condition can be excluded.

CHARLES E. FARR.

CAFFARENA, D.: RELATION OF RACHITIS AND SYPHILIS. (*Gazz. Osped.*, 1912, No. 61.)

Twenty children affected with rachitis were subjected to the Wassermann test with the result that 6 showed positive, with more or less pronounced reaction. After subsequent researches the author concludes that 30 per cent. of rachitic children show presence of syphilis, which is also found in 40 per cent of their families. C. D. MARTINETTI.

THERAPEUTICS.

GALLI, P.: COLLOIDAL THERAPY IN MEASLES. (*Gaz. Osped. e. Clin.*, 1913, No. 14.)

During a severe epidemic of measles the author had occasion to treat 35 abnormal cases with a mortality of 20 per cent. He attributes the favorable results to the liberal use of colloidal silver. The earlier this preparation is exhibited the better the outcome of the disease. The treatment should be persisted in until the patient is progressing satisfactorily.

C. D. MARTINETTI.

TRAMBUSTI, A.: QUININ IN SCARLET FEVER. (*Accad. Soc. Med. Palermo,* April, 1913.)

In the latter half of 1912 an epidemic of scarlet fever spread over the south of Sicily, but it was noticed that it did not invade the localities where quinin had been largely used for malaria. Bacteriological researches showed in the leukocytes of patients the presence of bodies not to be found in the normal blood. Suspecting some obscure relation of these bodies with malaria parasites, many patients were treated with injections of quinin bichloride with markedly favorable results.

C. D. MARTINETTI.

ARCHIVES OF PEDIATRICS

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EDITORIAL.

RETROSPECT AND PROSPECT.

“By dock and deep and mine and mill,
The Boy-God, reckless, laboured still!
Robed, crowned and throned, he wove his spell
Where heart blood beat, or hearth smoke curled
With unconsidered miracle
Hedged in a backward-gazing world.
Then taught his chosen bard to say,
“Our King was with us—yesterday!”

It would be a good thing for the folk who rant of “the good old days” and bore us with tales of what license they had in childhood as to eating and drinking, etc., or scorn the present-day ideas of baby saving and “baby specialists” to read Dr. Holt's account of the conditions of those self-same good old days, with all the bloom of antiquity carefully brushed off. It has always seemed to us that if with the pictures and descriptions of the simple, healthy life of earlier times could have been preserved for us also the *smells* of those days when sanitation was not considered necessary and infant mortality was the evidence of the hand of a beneficent if an uneconomical Deity, we should have less difficulty in understanding the comparative excellence of the way we live today. One need but dip lightly into the writings of our fellow physician, François Rabelais, to acquire all that is necessary to appreciate the probability of this statement.

Today, we are convicted of hygienic sin, and as conviction of sin animates the new convert to proclaim loudly his unworthiness, so we are likely to dwell unduly upon the awfulness of our present time as compared with our newly-found ideal and perhaps do not take what credit we may for the long way we have come.

Surely, nowadays no monarch, even though his family stock has run low and his progeny are feeble-minded or deaf-mutes, is complacent over the deaths of eighteen or nineteen children. Perhaps the increasing difficulty of bearing large-headed children has acted as a corrective to such indifference. If so, well and good. We shall have to class this with the falling off in the birth rate, which has been a beneficent factor to Germany and France, enforcing care in the rearing of those who are born. We venture to predict that never again will the Roman Isaak Waltons find the Tiber well stocked with the particular kind of fish which they drew up in their nets in those "good old days."

We blame artificial feeding now for the greater part of our infantile mortality, and yet, compared to its prototype of "the good old days," its bad qualities even seem almost beneficial. Small wonder that throughout English fiction the feeling of gratitude has been emphasized between the individual and that devoted elderly female, be she aunt or be she sister, who "brought him up by hand," a gratitude which should have in it all the deepest feelings of a Lazarus raised from the dead. And, although what is now being done is little enough to our awakened consciences and we see countless avenues leading to new endeavor, yet today is undoubtedly the best time there has yet been for a baby to be born into.

Even if he were "a beggarly boy and lived in a cellar damp" his chances for avoiding diarrhea, as Dr. Schereschewsky tells us, would be greater than if he were upstairs in the lighter but *hotter* stories. It is astounding to read that the indoor temperature, on a day when the thermometer stands 74°F. outside, may rise to 95°F.—21° higher than outdoors and that not until eight hours or more after sundown does a dwelling reach its maximum temperature and begin to cool off. This underlies the turning of fire-escapes into sleeping porches during the summer nights in our crowded East Side. This contributes to the mortality of infants, for they, whose heat production is great and who cannot take off their own clothes under this torrid heat, become less resistant to infection and lose their ability to digest their food. Hence diarrhea and death. A most interesting light is thrown on the importance of the heat factor by Dr. Schereschewsky's very careful and complete survey.

More and more emphasis is being placed upon the importance of the health of the child as an asset of the community. The warfare against the great white plague, in so far as it is aimed to eradicate tuberculosis, is directed to preventing the early massive infections of children. For it is believed that the cases which develop tuberculosis at puberty and in young adult life are cases of early infection long latent, which have been made active by some unusual strain. If children are not exposed to tuberculosis until after they are six years of age they seldom die of it, a contrast marked indeed with what obtains when early exposure has occurred. Similarly with other infections: if the first lustrum can be passed without infection, or, better, the first decade, the statistical chances for death are very low. So the medical care of children before school age is a necessary and important affair.

Cities and commonwealths are coming to realize that the general welfare of their citizens is a part of the function of the government. Dayton, O., in its new programme of city government by commission and city-manager, has definitely taken up the problem and may out-socialize Socialism. But as the child is father of the man, it is the prevention of infant mortality which underlies everything else and is the necessarily first step to a complete renovation of society.

MISCELLANEOUS

To the Editor of ARCHIVES OF PEDIATRICS:

I wish to report a group of cases which have been of interest to me. These are infants made sick by being fed milk that has been more or less frozen. During the past month I have been called upon to treat 11 infants under one year of age, all with gastrointestinal symptoms. The usual symptoms were vomiting within two to four hours after taking the milk; this was followed by frequent, loose, greenish stools with curds and a disagreeable sour odor, and a rise of temperature to 100° to 101° F. In 2 cases marked colic ensued. They were put upon diluted skim milk boiled, and recovery was complete in two or three days.

I have never had this cause of gastrointestinal disturbance brought to my attention so strikingly, and I have been unable to find reference to it in literature. If any of your readers have had similar experience or can give any light on the changes in the milk, I wish it might be published.

Burlington, Vt. C. K. JOHNSON, M.D.

A CORRECTION.

To Dr. Royster's paper in the November ARCHIVES should have been appended the statement that it was read at the International Congress for School Hygiene at Buffalo in August.

ORIGINAL COMMUNICATIONS.

INFANT MORTALITY, ANCIENT AND MODERN. AN HISTORICAL SKETCH.*

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In considering what subject I might bring before you upon an occasion like this, it has occurred to me that perhaps a general review of the changed attitude of society toward infants might prove not uninteresting—a change so marked as to seem almost revolutionary. I have tried to trace from the earliest times the growth of the modern conception of the value of infant life—how it has come about, by what influences it has been stimulated, and by what agencies the betterment of conditions has been effected, with the hope that looking at our work historically we may better appreciate the importance of what has been done and see its significance in relation to the future.

The problem of infant mortality is one of the great social and economic problems of our day. No resources of the State need so much to be conserved as do its children. A nation may waste its forests, its water power, its mines and, to some degree, even its land, but if it is to hold its own in its struggle for supremacy its children must be conserved at any cost. On the physical, intellectual and moral strength of the children of today the future depends. In all training and education physical considerations must come first. Unless the infants are saved there will be no children to educate. It is not true, as has sometimes been assumed, that a nation as a whole is improved physically by a high infant death rate. Visitors to the marasmus wards of a modern infants' hospital often remark upon the uselessness or futility of saving these infants. They look upon the effort as misguided philanthropy and almost as a perversion of medical science, arguing that however praiseworthy from a humanitarian point of view to save such infant lives, it is false economy and does not improve the race; that it interferes with the law of natural selection, which is the survival of the fittest; that by efforts to keep the feeble alive, degeneration of the race rather than improvement in it is favored.

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* Presidential address before the American Association for the Study and Prevention of Infant Mortality, at the Fourth Annual Meeting, held at Washington, D. C., November 14-17, 1913.

The argument is not a strong one and is based upon erroneous premises. In the first place, most of those who in infancy are regarded as physically unfit were healthy at birth and are merely the victims of a bad environment, improper feeding and neglect—conditions which it is quite possible to remove. When these obstacles are overcome these infants not only have the same chance to survive, but to grow into healthy, even robust, children as have others. How many of the world's brightest geniuses would have been lost had this law been rigidly applied, who can say.* It is hard to tell who are the unfit. A high infant mortality results in a sacrifice of the *unfortunate,* not the *unfit.*

Again, many of the causes which produce infant deaths are at the basis of delicate health and physical deterioration in those who survive. Such children later may become a burden to society. It is not enough to protect infants from early death; it is equally important to remove so far as possible those pernicious influences which have such an injurious effect upon the child in the modern city and tend to make him so greatly the physical inferior of the town or country dweller of a half century ago. Excessive mortality among infants is not a question which concerns the cities only nor the poor alone. In matters of health the whole community stands together, although the effects of unfavorable conditions always fall most heavily upon the poor and upon the young.

A high infant mortality is in no sense a protection to our body politic. We must eliminate the unfit by birth, not by death. The race is to be most effectively improved by preventing marriage and reproduction by the unfit, among whom we would class the diseased, the degenerate, the defective, and the criminal. In working for the survival of the feeble and the unfortunate we are not contravening nature's law and striving to save the unfit.

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* "One Christmas day a premature posthumous son was born in England of such an extremely diminutive size and apparently of so perishable a frame that two women who were sent to Lady Pakenham, at North Witham, to bring some medicine to strengthen him, did not expect to find him alive on their return. He would have inevitably been consigned to the Caverns of Taygetus if the two women had carried him to Spartan Tryers. As it was, the boy grew up into Newton, lived more than fourscore years, and revealed to mankind the laws of the universe. If he had perished, England would not have been what she has in the world. . . . In Paris one evening a puny child in a neat basket was picked up; he had been left at the church door. The commissary of police was about to carry him to a foundling hospital when a glazier's wife exclaimed, 'You will kill him in your hospital. Give him to me, I have no children, I will take care of him.' It was D'Alembert, who made innumerable physical discoveries."—*William Farr.*[18]

POLITICAL AND ECONOMIC CONSIDERATIONS.

We have been considering the question somewhat more especially from its individual and sociological side. The political or economic side is not less important. In several European countries the greatest argument for the protection of infancy is to be found in a steadily falling birth-rate, so rapid as to threaten the political position of the nation. Of twenty European countries, nineteen have shown a declining birth-rate between 1881 and 1905, the average decline being 3 per 1,000 of population. Only one state, Bulgaria, showed an increase.[1] In nearly all there has been a steady decline, but with great uniformity this has been most rapid since 1900. The cause or causes of this general fall in the birth rate we cannot here discuss; but judging by the extent of this decline they are certainly not accidental nor temporary.

In the United States our birth records are so imperfect that definite conclusions cannot be drawn from them; but all evidence goes to show that except among the immigrants the same general decline exists as is seen in Europe. The problem of a falling birth rate is not yet with us an economic one, but it may perhaps at no distant day become so.

The situation has been recognized in France for a generation or more. Her statesmen have viewed with alarm the fact that her birth rate was the lowest in Europe. She was among the first, as we shall see later, to grasp the political significance of this fact and to bestir herself to remove causes of a high infant death rate. Germany, also, is now facing the question of a rapidly falling birth rate and realizes the imperative necessity of meeting this by reducing the number of infant deaths.

THE SACRIFICE OF INFANT LIFE AMONG THE ANCIENTS.

The infant problem is as old as the human race, although in different places and at different periods of the world the viewpoint has changed. Among the savages and barbarians the question was one of getting rid of the superfluous children when mouths became too many for the food supply to fill. Later, among more advanced nations, the weak and feeble were exposed to death because they were assumed to be of no value to the State; only those who were vigorous enough to grow up into fighting men were deemed desirable citizens. In Sparta, the State claimed a right over all children born. Every newborn infant was passed upon by a committee, and upon their approval the child was accepted; upon their disapproval it was exposed to death. Those who were permitted to live were most carefully reared, with the result that the Spartans became physically the finest race of their time.[2] Lycurgus, Solon, Aristotle, and Plato all regarded infanticide as proper and desirable to prevent a too rapid increase in population, and also to remove the weak and the deformed.[3] [4] Only the Thebans considered infanticide barbarous and made it a crime punishable by death. Exposure of weak children to death was not frequent at Athens and in that city an establishment existed in which a certain number of illegitimate children were reared by the State.

In Rome the father had the power of life and death over his newborn child. According to custom the infant was placed by the midwife upon mother earth. If left upon the ground, it was a sign that the infant was to be immediately exposed to death; if the father desired to preserve its life, he indicated this by raising the child in his arms and invoking the goddess Levana. This act was known as *"tollere infantem."*[4] The idea has come down to us in the expression "to raise a child." It is also preserved in the French phrase, *"elever un enfant."*

In the early days of Rome the Greek practice was followed of exposing to death delicate and deformed infants. They were sometimes exposed in the market place, sometimes at the foot of certain pillars, sometimes in the forests and sometimes they were drowned. They were considered both in Greece and Rome the property of any one who found them and who chose to rear them. When no one claimed them they were cared for by the State. When reared by private persons they were often greatly abused, sometimes mutilated and used for begging, and sometimes, it is said, "used for purposes of magic."

Though maternal nursing was commonly practised among the Romans many mothers in the higher ranks of society neglected it, and Julius Cæsar ridicules such women for carrying little dogs in their arms instead of their own infants. Tacitus, in complaining of Roman degeneracy, says: "Formerly grave matrons attended to their own children as their first family concern, but now they entrust them to some Grecian girl or other inferior domestic."[5]

At a later period the value of infant life began to be appreciated. In the time of Trajan some organized assistance was given to infants. Marcus Aurelius also showed an interest in the foundling. Cicero states that Camillus, when Consul, proposed a tax upon bachelors for the support of infants.[6]

In India and China infanticide was extensively practised from the earliest time; indeed, with the exception of the Hebrews and Assyrians, it was general among all the ancient races. Though sometimes confined to girls, it usually was extended to include also all delicate, feeble and deformed male children. The motives everywhere were much the same—famine, poverty, or the promotion of national efficiency by eliminating the weakling.

The attitude of society toward infant life was determined largely by the relation of the child to the State. Its life was considered of value if it was healthy, vigorous, and especially if it was a boy; but if feeble or deformed and, under certain circumstances and in some countries, if a girl, it was exposed to death without hesitation or regret. That mistakes in deciding who were unfit were sometimes made is shown by the fact that Cyrus, the son of Cambyses, was exposed in a forest, but secretly saved by the woman who was sent to make way with him. The right of infants to life and the value of infant life as such was not recognized until very modern times. The early idea of infanticide was bound up with the authority of the father or the State over the life of the child. In India and China, although infanticide is practised today, it has very greatly diminished, and it does not meet with public approval.

INFLUENCE OF CHRISTIANITY AND THE EARLIEST PROVISION FOR FOUNDLINGS.

After the first few centuries of our era a different and more humane attitude toward infant life is discernible. The first evidence of legislation having for its object "abandoned infants" came with the establishment of Christianity in Rome. Before that the authority of the parent was absolute. In the beginning of the fourth century we find Constantine endeavoring to prevent parents from abandoning their children and giving aid to the needy from public funds; because, as he said, "The wants of the newborn child must be filled without delay." In the latter part of the fourth century the Emperors Valens and Gratian ordered that every parent should bring up his own infants; they pronounced penalty against exposing them and made infanticide punishable by death. In 530 Justinian gave liberty to foundlings and proposed that they be educated at public expense, but long wars prevented the carrying out of his plans.[4]

There gradually grew up in the middle ages all over Europe a general sentiment of pity for the foundling or the abandoned infant and this apparently was the chief motive which led to their reception in churches and hospitals, and later to the establishment of special institutions for the protection and care of these waifs of society. This was almost invariably done by the religious orders, seldom by municipal or State authorities. All that was thought of in the beginning was simply shelter for these unfortunates during their usually brief existence.

In the sixth century at Trèves a marble cradle was first placed outside the door of the church to receive any infant who might be placed there.[7] Later this example was followed by many churches and afterward by some public hospitals. It is recorded[8] that at the end of the twelfth century fishermen in the Tiber caught in their nets so many bodies of newborn infants who had been drowned, that Pope Innocent III. immediately arranged to have infants received in the *Hôpital du Saint-Esprit;* this part of the hospital was named "*Conservatoire de la Ruota.*"* In 1316 the *Hôpital des Innocens* was founded in Florence.

In the reign of Francis I.,[3] toward the end of the fifteenth century, we find a brotherhood formed to care for young infants; and fifty years later the *Hôtel Dieu* opened its wards to receive any infants left at its door. These were placed in wards with sick adults and, it is said, usually died in a few days. Several private homes or shelters for their reception were opened during that century, but until the end of the seventeenth century no public foundling asylum existed in France.[8] Not long after this, special institutions for foundlings came into existence over the continent of Europe. Practically all these were under the aegis of the Church; shelter and care for these children were furnished as a religious duty.

The Society of St. Vincent de Paul in 1638 seems to have been the first to influence public authorities to acknowledge the civil existence of foundlings.[8] A little later Louis XIV. recognized the value to the State of these infants and gradually the idea grew that the foundling not only had a right to life, protection and care, but might be of value to the State. The provisions for their needs were, however, very meagre and wholly inadequate.

What the infant mortality was in the period of which we have been speaking must be left to conjecture. No statistics which are at all reliable are at hand. Both in public institutions and out of them the death rate must have been something appalling under conditions then existing.

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* "The wretched mothers dropped their babies on the foundlings' wheel of fortune (*Ruota*) instead of on the street."—William Farr.[18]

THE BEGINNING OF VITAL STATISTICS.

A beginning of vital statistics in England was made in 1538[9] by Henry VIII., who ordered that the incumbent of every parish keep a true and exact register of all christenings, weddings and deaths. Although a similar order was issued by Elizabeth in the next reign it was not until long after that anything like complete records were kept. In the city of Geneva, however, fairly full and complete vital statistics are available since the year 1549.[10] But even in the most enlightened countries as a whole little that is reliable can be obtained in vital statistics until about a century ago, and in the majority of States for hardly half that time. In 1812 a law was passed in England prescribing the form of registration for all deaths and making one liable to a fine who did not comply.[11] However, "bills of mortality," as they were called, were kept in many towns before that time, which enable us to form some idea of infant mortality for an earlier period. Our own country has been disgracefully behind most of the civilized nations, and even now in only a few of our states are proper records kept. Vital statistics are a form of national bookkeeping which is most essential if we would know what actual conditions are. We in the United States have been most remiss in the matter of marriage and birth records. One of the first tasks to which this Association has addressed itself is to secure throughout the country complete figures of birth registration. The importance of such records for a study of the problem cannot be overestimated.

INFANT MORTALITY IN THE SEVENTEENTH AND EIGHTEENTH CENTURIES.

While we cannot know the infant death rate in percentages in Europe in the seventeenth and eighteenth centuries, we get some hints of what it was from certain facts in history. Justin McCarthy, in his "History of the Four Georges," speaking of Queen Anne, says that Anne had no children living at the time of her death, 1714: she had borne her husband a great many children, eighteen or nineteen, it is said, but most of them died in infancy, and only one, the Duke of Gloucester, reached his eleventh year. Granting that many of them were probably delicate children, what a revelation this is of the ignorance of the care and nutrition of infants. If such a thing was possible in the royal family, what must have been the conditions throughout the kingdom generally.

Gibbon, the historian, born a generation later, in 1737, in his "Memoirs" says: "I was succeeded by five brothers and one sister, all of whom were snatched away in their infancy." He continues, "The death of a newborn child before that of its parents may seem an unnatural, but it is strictly a probable, event, since of any given number born the greater number are extinguished before their ninth year. Without accusing the profuse waste or imperfect workmanship of Nature I shall only observe that this chance was multiplied against my infant existence." He goes on to state that so feeble was his constitution that in the baptism of each of his five brothers his father's prudence successively repeated his Christian name of Edward, that, in case of the death of the eldest son, this name might still be perpetuated in the family. Yet Edward Gibbon lived to the age of fifty-seven years, and became one of the great men of his day.

In his time that a large proportion of infants born should die was an accepted fact. It need not surprise us when we consider the condition of medical science at the time, the dense ignorance regarding private and public hygiene and sanitation, and the consequent ravages of infectious diseases.

The infant mortality in institutions was much greater than elsewhere. In the Lying-in Hospital in Dublin from 1781 to 1785 it is said[12] that 16.5 per cent. of infants born died before they were two weeks old. By opening the windows and attending to ventilation and cleanliness this was reduced to 4 per cent. within a few years mainly by the elimination of tetanus of the newborn, to which previously more than nine-tenths of the deaths were due. In the British Lying-in Hospital from 1750 to 1759 the mortality was 6½ per cent. of the infants.[9] Percival,[13] writing in 1789, states that in Manchester half the children born die before reaching the fifth year. A writer in a French medical journal,[14] in 1780, makes the statement that in that country half the children born died before the end of the second year. At this time, the latter half of the eighteenth century, we are warranted in stating that the infant mortality generally was over one-fourth of the total mortality, and the mortality under five years over half the total mortality.

That the infant death rate was excessively high excited no comment or surprise. This had always been the case; and it was considered unfortunate but inevitable. Human life was cheap, and infant life cheapest of all. Gradually the opinion grew that this was not so inevitable and necessary as it seemed. There appeared now and then in different parts of the world men who were impressed with the idea that much of this sacrifice of infant life was unnecessary and might be prevented. Some of these persons were philanthropists, but most of them were physicians who foresaw the dawn of a better day for the infant in the not distant future and recognized some of the means through which this might be hastened. The value of human life, and especially the intrinsic right of the infant to a chance for life, gradually came to be recognized during the nineteenth century. It seems to have been one of the results of the growth of democracy, which spread so rapidly after the French Revolution.

Although the economic value of infant life and the importance of saving the children were not yet appreciated, there were even in this period voices of warning and protest raised against the conditions then prevailing with reference to infants. Black,[15] writing in 1782 an historical sketch of medicine, states that in Great Britain during the latter half of the seventeenth century there were only three men, one of whom was the renowned Sydenham, who gave any special attention to the diseases incident to young infants. He says: "Up to this century the management of these tender creatures in sickness was left to ignorant old nurses and rude quackery. Even at present the bills of mortality, in cities especially, are a melancholy proof that the carnage made among the young part of the human species has not yet attracted the attention of medical writers."

In 1749 William Cadogan,[16] of the London Foundling Hospital, talks more hopefully. He says, "It is with great pleasure I see at last the preservation of children become the care of men of sense; the publick will soon find the good and great effects of it. Children have been left too long to the superstitious care of old women. What is needed is a philosophic knowledge of nature, to be acquired only by learned observation and experience." These and other contemporary writings in the same strain give us glimpses of conditions which may be regarded as fairly typical of the times.

CONDITIONS IN ENGLAND AT THE BEGINNING OF THE NINETEENTH CENTURY.

The early part of the nineteenth century witnessed a considerable fall in infant mortality due to the introduction of the practice of vaccination. To us at the present day that small-pox was ever a large factor in infant mortality seems surprising. Yet writers of that day tell us that small-pox committed its chief ravages upon children under, or about, the age of two years; also, that one-fifth of all the children born died of small-pox before reaching the tenth year, and that one-third of all the deaths of children were due to this cause.[17]

An interesting picture of conditions existing in England in the beginning of the nineteenth century is given by John Bunnell Davis in a small book published in 1817, with the following title: "A Cursory Inquiry into Some of the Principal Causes of Mortality among Children, with a View to Assist in Ameliorating the State of the Rising Generation in Health, Morals and Happiness."[17] Davis is to be regarded as a pioneer in this field. His work shows not only evidence of careful study of the problem of infant mortality as presented by the conditions existing at his day, but also a grasp of principles to be applied in remedying the evils of the time. We find him quite modern in his ideas, and many of the things advocated by him are those upon which we of the present day place the greatest emphasis. He strongly urges the importance of maternal nursing and the moral obligation of it.

He says, "A practice more fatal in its effects than the combined operation of all other causes is that of wet nursing and the high mortality among wet nurses' infants." Again, "One way for men to become good husbands and fathers is for women to become real mothers." He saw that maternal nursing not only saved life, but was an important factor in the future health of the child. "This practice [maternal nursing] so loudly called for by nature renders children more robust, and they are better able to resist a thousand causes of death which threaten them in the arms of a stranger." "Is it," he says, "too much to hope, to expect, indeed, that mothers will see the necessity of this and will practice a virtue so noble, so precious, and so natural." The economic importance of preventing infant mortality did not escape him. "To promote the health and vigor of its subjects is the primary object of a nation's strength."

Davis laments the fact, which was very patent in his day, "that from causes inexplicable the disorders of children do not appear to have met with that exclusive and peculiar attention which their obscure and fatal nature requires." Though he met with much opposition and many discouragements, his efforts resulted in what seems to have been the only public dispensary for children in London in 1816.

Davis perceived the educational value and practical importance of combining with the special work of his dispensary for children social service by a voluntary corps of house visitors. He says: "If benevolent ladies could be prevailed upon to form district committees to visit and inspect the health of sick indigent children, much practical good would result from a medical and moral point of view. By such visitations as these it may be predicted that the instances of mortality among children will be quickly diminished; at the same time that such benevolent females corrected the absurd notions and errors of the poor as to the domestic management of their children." He also printed and circulated leaflets giving rules for the care of children at home and directions for the management of common ailments. Three methods of feeding were in vogue in Davis's day—maternal nursing, which was of course the rule, though it appears not infrequently given up voluntarily; wet nursing, the infant being usually taken to board in the home of the wet nurse; and artificial feeding, or "bringing the child up by hand." The last-mentioned method was almost invariably unsuccessful. The mortality was appalling, comparatively few survived when so fed.

EFFECTS OF URBANIZATION OF POPULATION AND OF THE FACTORY EMPLOYMENT OF WOMEN.

The reduction of infant mortality following the introduction of vaccination was only temporary, for two great influences dependent upon the industrial development of the time came into existence, both of which were most prejudicial to infant life. These were the rapid growth of cities at the expense of the country and the extensive employment of women in factories. The urbanization of the population of most European countries has gone steadily forward with increasing rapidity since the beginning of the nineteenth century. In America it has been marked only since the Civil War.

City life a hundred or a hundred and fifty years ago, though cities were small as compared with those of today, was not safeguarded as it now is by modern sanitation, with its laws of hygiene. The older cities were compactly built, with narrow streets, very inadequate provision for light and air, and very few parks or breathing places. Plumbing was unknown, sewerage very rare, the water supply scanty and easily contaminated, and such preventive measures of disease as food inspection, quarantine and disinfection in contagious diseases, and proper street cleaning were still undreamed of. The average city, with a population of 20,000 or 30,000 at the beginning of the nineteenth century, exhibited unsanitary conditions and often an overcrowding which can be compared only to the very worst districts in New York or London today. When, in such surroundings, a mother relinquished the personal care of her infant to become a factory employeè, and when maternal nursing was replaced by substitute feeding carried out by one densely ignorant of the first principles of the subject, the results can well be imagined.

The relation to infant mortality of the employment of women in industries away from their homes is a question of real and fundamental importance. No single factor is so prejudicial to infant life as taking the mother away from her infant after the first month, often sooner than this, and keeping her away at work for six days in the week, thus depriving the child of the advantage of maternal nursing and substituting for the mother's care usually that of a young, ignorant, inexperienced person, frequently only a child, often an invalid. Factory work told even more upon the health of women then than it does today. Work was harder, hours longer, wages smaller and the factories frequently most unsanitary.

CONDITIONS IN EUROPE IN THE MIDDLE OF THE NINETEENTH CENTURY.

The conditions prevailing in Europe in the middle of the nineteenth century are pretty fully set forth in the *Journal of the Statistical Society* of London, in 1866.[18] At this time, about 1860-61, the infant mortality per 1,000 of registered births was as follows: Sweden, 141; Scotland, 149; England, 170; France, 223. In all of these countries the birth records are fairly complete and the figures may be taken as indicating comparative conditions in the different countries. The lower mortality of Sweden and Scotland was attributed partly to the cooler climate and partly to the more general practice of maternal nursing and its continuance for a longer period. Wide differences were seen in different towns and districts of the same country, this varying very constantly with the extent to which women were employed away from their homes, whether in factories, in agriculture or other industries. In one province in Finland, where the mortality was excessive, investigation showed a great lack of maternal nursing. While the mothers were away at work in the fields the infants were fed, according to an ancient custom, upon sour milk from a horn suspended over the cradle. This contrivance was evidently the prototype of the nursing bottles with long glass and rubber tubes that were very generally employed with us until twenty-five years ago. The state of the milk and the results seem to have been much the same in both instances.

In France, the treatment of infants, especially in the country districts, is described as deplorable. A contemporary writer[18] says: "The women work in the fields nearly as much as the men, which affects feeding and all domestic arrangements." The bad results and high infant mortality were attributed largely to artificial feeding or bad wet nursing. There was exceptionally little breast feeding and even when ill infants were still fed on insufficient cow's milk and pap, or bad soup and black bread. "The mothers cannot, or will not, nurse their infants because they are obliged to go out to work." The same writer concludes that it was common experience for three-fourths of the infants fed in this manner to succumb in a very short time.

In Norway, notwithstanding the poverty of the peasants, the infant mortality was low. Because of their poverty, breast feeding was almost universally practiced and frequently continued until children were two or three years old. That breast feeding was found to be the cheapest by these people at this time is a suggestion which may well be pondered by those seeking a solution of the problem of infant mortality at the present time.

In England the infant mortality bore a very close relation to the extent to which women were employed in factories. An interesting demonstration of this is seen in the cotton mill district of Lancashire during our Civil War. During the first year of the war the imports of cotton decreased 40 per cent., with the result that when the conditions at the mills were at their worst there were in Lancashire alone 247,000 operatives idle and 165,000 others working on part time. Of the entire population of the district, 24 per cent. were receiving charitable relief. The effect of this was a marked increase in the general mortality as a result of privation and poverty, but a surprising reduction in the infant mortality. In the year before the war it had been 184 per 1,000 births; at the height of the depression of the cotton industry it fell to 168, but rose again after the close of the war, when work in the mills was fully resumed, to 200 per 1,000.[11]

A somewhat similar thing was seen during the Siege of Paris;[11] while the general mortality doubled, the infant mortality fell 40 per cent. Opportunities for outside work being shut off, women could not go out to work and were compelled to stay at home and so nursed their children.

An investigation was made between 1859 and 1861 into the sanitary condition of England by Sir John Simon and others,[11] as a result of which the conclusion was reached that just in proportion to the number of adult women employed in factories or agriculture the mortality of their infants increased; that in districts where the proportion of women so employed was large the infant mortality was from two to three times as great as in the standard districts. The care, or, rather, the neglect, of infants under such circumstances is described as "almost murderous." Homes were ill kept, infants badly fed or starved and the cries of hunger or distress quieted by opiates, which were in great demand in centers of manufacturing industry. An operative of the better class in Birmingham, England, who collected money for expenses attendant upon the death of children in a factory employing 150 women gives it as his opinion that at this time 10 out of every 12 children born to the married women in this factory died within a few months after birth.

An interesting and instructive comparison has been made in England between the average mortality for ten years in eight towns with extensive textile industries, and eight other towns of approximately the same size. The average deaths in the textile towns was 182 per 1,000 of births; in the non-textile towns it was 150. In the textile towns 43 per cent. of the married women were employed in industry; in the non-textile towns but 3 per cent.[11] There seems thus to be a very definite and intimate relation between the extent to which women are employed in industry and the infant mortality rate.

MILK PRODUCTION IN NEW YORK IN 1840.

The situation in the cities of our own country in the middle of the last century was little better than in those of Europe. A graphic picture of the conditions prevailing at the time in New York is given in "An Essay on Milk" by Robert Hartley, which was published in 1842.[19] At that date he states that fully five-sixths of the milk consumed in New York was from cows housed in the city and fed upon distillery waste. Adjoining a distillery at Eighteenth Street and Ninth Avenue were cattle sheds containing as many as 2,000 cows at one time. The animals were kept under conditions which were foul almost beyond description; they had no exercise, no fresh air, no fresh food and no hay. Their sole food was the so-called "distillery slop," of which they consumed barrels a day. The stalls were rented to the owners of cows for five dollars a year and the food was supplied at nine cents a barrel. The milking was often done by city tramps, who performed this labor for the privilege of sleeping in the cow sheds. Compare for a moment these conditions with those existing in an up-to-date dairy of the present, with its cement floors, whitewashed walls, sterile utensils and sterilized milking suits of the trained men. It should be remembered that the conditions alluded to were the rule, not the exception, and that for the great majority of infants deprived of maternal nursing this milk was their food; it was, in fact, the only milk obtainable.

Those who have read Paul Leicester Ford's book, "The Honorable Peter Stirling," will recall that this ambitious young attorney first came into notice as the prosecutor of the milk dealers at the time of which we are speaking.

The mortality records of the time, imperfect though they are, reflect the unwholesome conditions which we have described.

With a population of a little more than 300,000 in 1840 New York had a death rate of 25 per 1,000, and one-fourth of the deaths were in infants and over half were in children under five years. The records of the time in Boston and Philadelphia show about the same conditions prevailing there.

HIGH INFANT DEATH RATE OF THE LAST HALF OF THE NINETEENTH CENTURY.

Throughout the nineteenth century, especially the latter half, to its very close, we note a constantly high infant mortality. Although owing to advances in medicine, hygiene and modern sanitation, general mortality records show a fairly uniform decline after about 1870, there was no general fall in infant mortality till 1900.* In many places there were seen side by side a falling general mortality and a rising infant mortality.

It is barely forty years, or only since 1870, that the new interest in the lives of infants has been manifest. This has come about partly through a growth in humanitarian ideas regarding the value of infant life, which has been accompanied by a desire to ameliorate social conditions upon which a high infant mortality depends. This was first felt by individuals, but soon came to be appreciated by municipalities and finally by states and nations. Together with the growth of the humanitarian idea has been the development of sanitary science and preventive medicine and the great advances in our knowledge of the diseases of children which have made it possible to check, to some degree at least, the enormous infant death rate, which had continued almost the same since vital statistics were first kept.

EARLY ORGANIZATIONS TO SAVE INFANT LIFE.

Some important organizations affecting child life, most of them originating in France, had been in existence before 1870. Perhaps the most valuable was the *crèche,* or day-nursery. The first one was founded in 1844 by Marbeau, mayor of the first arrondissement of Paris, who, observing the neglect of infants whose mothers were at work, and, finding that no provision for their care existed, conceived the idea of a place where such a thing could be properly done. By the aid of private subscriptions a room was secured in a poor street, twelve willow cradles were installed and the whole placed in charge of a nun, while a doctor visited the place daily.[20] It is an interesting sidelight upon the care of infants of the time to note that a part of the organization consisted of two persons who were engaged as "rockers."

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* Infant Mortality per 1,000 Births for Different European Countries for Five-Year Periods.[1]

	England and Wales	Ireland	Scotland	France	Germany	Italy	Belgium	Norway	Sweden
1881-'85	139	94	117	167	207	175	156	99	116
1886-'90	145	95	121	166	208	175	163	96	105
1891-'95	151	102	126	171	205	185	164	98	103
1896-'00	156	106	129	159	201	168	158	96	101
1901-'05	138	98	120	139	190	168	148	81	92

From this humble beginning the idea rapidly spread and many more *crèches* were soon opened. Three years later the *Société des Crèches* was formed to standardize methods of work and facilitate coöperation. From France the *crèche* rapidly spread to Austria, Italy and Germany, and soon they were opened all over Europe. Most of them received some public support, but they depended largely also upon private contributions.[20] They were usually in charge of nuns. While the *crèche* has, perhaps, not been a large factor in reducing infant mortality, it has done much in calling attention to the neglect of infants of working women in cities and arousing public interest in the welfare of infants generally.

In 1865 a society was organized in France known as the *Société Protectrice de l'Enfance.*[21] Its chief objects were to encourage maternal nursing, watch over infants sent out to be wet-nursed, and instruct mothers in all classes of society in the care of their children. As a result of ten years' work this society made a great impression on the infant mortality in the district in which it operated.

France again led the way in 1876 in the organization of a Society for Nursing Mothers (*Société d'Allaitement Maternelle*).[11] This was destined to have a wide influence in the reduction of infant mortality, for its example has been followed and its methods imitated in many cities and countries down to our own day. It approached the infant problem from a different standpoint and sought to save the child by caring for the mother. Before confinement, homes or refuges were opened where poor and destitute women could be sheltered for a few weeks until they were sent to maternity hospitals, and assistance or partial support was given to nursing mothers during the first year to make breast feeding possible. This aid was supplemented by regular monthly observations of these infants by physicians and visits by social workers. The beneficial effects of this work were at once evident. In sixteen years this society cared for 10,000 women in the pre-confinement homes, and Pinard says that no women received into maternity hospitals from these homes died in childbirth, and that a noteworthy improvement was seen in children born; they were above average weight and were much more vigorous than the children of women not receiving such care. During the first eighteen years of its existence the society aided nearly 40,000 mothers.

EARLY LEGISLATION.

In 1872 there was passed in England what was known as the Life Protection Act,[11] which was directed against the crying evils resulting from the practice of farming-out infants. It provided for the registration and licensing of all places where infants apart from their parents were received for hire; to this a provision for inspection was subsequently added.

Two years later, in 1874, France passed a somewhat similar law.[6] It was known as the Roussel Law, or *Loi Protectrice des Enfants.* The custom prevailed extensively at that time of sending young infants from the cities into the provinces to be wet-nursed. Comby[6] states that the infant mortality under these conditions was appalling. About 20,000 infants were sent from Paris in a single year, and the death rate among them was 75 per cent. In some places it was even higher than this. The death rate among the infants of wet nurses was also enormous. The Roussel law aimed at the correction of abuses which had grown up in connection with this wet-nursing industry and provided for government inspection of all places where infants under two years were cared for. The passage of these two statutes is noteworthy as being the first public recognition of the problem of infant mortality and the first legal efforts made to diminish it.

The factory employment of mothers was early recognized, and, as has already been mentioned, was an important cause of a high infant mortality.[22] The next legislation relating to this subject was the passage of laws which forbade the employment of women in factories for a certain number of weeks before and after confinement.* Such a law was first passed in Switzerland in 1877.

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* European Laws Relating to the Employment of Women in Factories.[10]

Switzerland	1877	8 weeks, of which at least 6 after birth of child.
	1897	Law amended requiring a longer rest before confinement and special regulations regarding certain occupations.
Hungary	1884	4 weeks after confinement; aided by insurance.
Austria	1885	4 weeks after confinement; medical aid and a daily subsidy equal to 60% of the earnings of the working woman.
Holland	1889	4 weeks after confinement.
Belgium	1889	4 weeks after confinement.
England	1891	4 weeks after confinement.
Germany	1891	4 weeks after confinement if medical certificate is shown; otherwise, 6 weeks. Compulsory sickness insurance giving aid 4 weeks after confinement.
Portugal	1891	4 weeks after confinement.
Norway	1892	4 weeks after confinement if medical certificate is furnished, otherwise 6 weeks. Women must not engage in dangerous, unhealthful or exhausting trades during pregnancy.
Spain	1900	3 weeks after confinement; employer to pay wages.
Sweden	1901	4 weeks after confinement; less if a medical certificate is produced.
Denmark	1901	4 weeks after confinement; less if a medical certificate is produced.

This example was followed by Hungary in 1884, and shortly after this time in turn by Austria, Holland, Belgium, England and Germany.[10] These laws varied somewhat in stringency, but all aimed to secure for the mother for a certain number of weeks, usually for six after her confinement, and in some cases for two weeks before, a certain immunity from labor of this kind.

It has rarely happened that much has been accomplished by legislation in reforming social evils and this has been no exception. But it was another step forward. Where employers voluntarily continued wages during this period of enforced cessation from work, as a certain number did, its beneficial results were very striking. In other cases the operation of the law often was only to substitute for the previous work in the factory harder work at the home. The main benefit of these statutes was perhaps to arouse public opinion by calling attention to the disastrous effects of hard work under such circumstances both upon the health of mothers and their infants, and to lead to efforts to ameliorate these conditions by assistance in other ways. The enlightened employer of today recognizes the fact that efficiency of labor is promoted by securing to employees good sanitary conditions for work; but a generation ago this was hardly thought of, much less practiced.

RECOGNIZED AS A SOCIAL PROBLEM.

Interest in infant mortality as a social problem was, I think, first shown at the Dublin meeting of the National Society for the Promotion of Social Science in 1861. At this session William Moore[12] made an address upon the causes of excessive infant mortality in which he forcibly set forth the conditions then prevailing in Great Britain and emphasized the vital importance of this subject in its social and economic aspects.

Ten years later, in 1871, at a meeting of the Social Science Association in Philadelphia,[23] the subject of infant mortality was a topic of discussion. Attention here also was called to the national importance of the welfare of the infants who are, or should be made, a source of wealth to the state.

At the first meeting of the International Congress of Hygiene, held in Brussels in 1876,[21] the subject of infant mortality was considered. One of the great causes there assigned for a high infant death rate was popular ignorance of the laws of hygiene, and a strong plea was made for the more thorough instruction not only of parents, but of young doctors and mid-wives in this subject. At the second meeting of this Congress, held in Paris in 1878, the hygiene of infancy was the first topic for discussion. At this session a committee (consisting of Bertillon, Marjolin and Bergeron) appointed to make an investigation made a strong presentation of the subject of infant mortality, its causes, extent and remedies. This drew forth a full discussion and excited great public interest.

Since that time, but especially since 1890, nearly every congress of hygiene or social science has discussed the problem of infant mortality. I will mention only a few of the more important organizations and meetings for considering this question: The National Congress for Infancy at Florence in 1896; the League against Infant Mortality, Paris, in 1902; the International Congress of Milk Depots, in Paris, in 1905; an International Conference on Infant Mortality, in London, in 1906; the International Union for the Protection of Child Life, in Brussels, in 1907; a large exhibit in Berlin in 1908, portraying the problem of infant mortality in all its phases; a Second International Conference on Infant Mortality, in Westminster, in 1908; the German Society for the Protection of Infants, in Munich, in 1909; the American Association for the Study and Prevention of Infant Mortality organized at New Haven in 1909; the English-speaking Conference on Infant Mortality, in London, in 1913.

These organizations and meetings are evidence of the worldwide interest in the problem of infant mortality, and also give an idea of how very recent all this interest is. Public concern regarding this question is only about thirty years old and the real awakening has come since the beginning of this century.

CAUSES OF THE MODERN AWAKENING.

In seeking for the causes of this awakening many factors must be considered. It has not come about from any one influence, but is a result of many; the motives which have aided in bringing this about have been varied. Some have been stronger in certain countries, while in other lands different influences have been at work. Speaking generally for the world at large, the humanitarian motive has probably been the strongest one. It is the general desire for a betterment of social conditions which has been most widely influential. This, I think, has been the chief motive in America.

Among the European nations, especially France, it is the economic aspect of infant mortality which has been uppermost. It is surely not an accident that the French have been foremost in their interest in this question and that so many of the organizations or agencies for the reduction of infant mortality have originated with them. For more than two generations they have viewed with apprehension the fact that with a high infant death rate their birth rate was the lowest in Europe and steadily falling. (It has been from 20 to 22 per 1,000 of population for the past ten or fifteen years; it was 19.7, the lowest then recorded, in 1910.) How to save their infants has become a public question of the first importance. With a smaller loss by emigration than either Germany or England, the population of France in the twenty years from 1891 to 1910 has increased less than a million, while during the same period Germany has increased over fourteen millions and England over seven millions. At the present time the figures giving the birth rate are published quarterly in the general press and the returns are scanned with as much interest by publicists as the yield of wheat or the factory output. It is not then surprising that a government decree was issued only last year by the Minister of Finance for the formation of a large and influential Commission to study this question.

Germany also has been greatly stirred by the economic aspect of infant mortality. While her birth rate has been and still is considerably higher than that of France, its fall, especially in the past ten years, has been more rapid. From 1890 to 1892 the average birth rate was about 35.5 per 1,000, but it declined steadily, especially since 1902, to 31.1 per 1,000 in 1909. In five of the largest German cities the decline in the birth rate from 1901 to 1910 has been from 33.5 to 24.1 per 1,000.

A third influence has been the progress made in medicine and sanitary science and especially the enormous advances in preventive medicine in the last thirty years, by which it has been shown what was possible in hygiene and public health. Better sewerage, pure water, clean milk, cleaner streets, food inspection, attention to ventilation and to all matters of general hygiene, have done much to overcome the unfavorable effects of city life upon the very young. There has grown up a certain noble rivalry among the health departments of our greater municipalities in lowering the general mortality rate, and especially the infant mortality, as being one of the largest factors. This ambition to lower all previous records is characteristically American, but it has brought about results which are truly remarkable and which make all previous accomplishments in this direction seem like the work of amateurs.

THE MILK DEPOT AND INFANT CONSULTATION AS INFLUENCES.

Let us now pass to a consideration of some of the means employed to bring about results of such magnitude. I have already mentioned the French Society for Maternal Nursing, which since 1876 emphasized what is now known as prenatal care of the infant, and also the continuous observation of young infants by trained visitors. Two other important organizations, both French, came into existence in 1892 and 1894 respectively. These were the Consultations for Nurslings (*Consultations de Nourissons*) and the Milk Depot, or *Goutte de Lait.*[24]

The first Consultation was organized by Budin in Paris in connection with a maternity hospital. After discharge, the infants were brought back for regular weighings and observation and examination for a period of two years; the mothers instructed in infant hygiene and feeding and advised in minor ailments. Breast feeding was encouraged and assisted; when it was not possible, sterilized milk in separate feeding bottles was supplied. The great advantage secured by this plan was continuous, intelligent supervision of the mother and, through the mother, of the infant from its birth.

Two years later, in 1894, the first milk depot was established by Dufour. Its purpose was proper artificial feeding under medical supervision. These two organizations, the Consultation and the Milk Depot, have since in many places been merged into one. They may be considered as really marking the beginning of the modern movement for the reduction of infant mortality. They have spread all over the civilized world and have proved to be, when properly conducted, one of the most effective agencies, if not the most effective agency, known for the reduction of infant mortality.

Several things are essential to the successful operation of a milk depot. Budin has well said that the Consultation is worth just as much as the physician who conducts it, but no more. This work must be done by physicians, not trained nurses nor social workers. The physicians must themselves be properly trained for their task, and, finally, they must be paid for it. The best results cannot be obtained by placing this responsibility upon voluntary workers. The milk depot, unless properly conducted, may, by increasing the facilities for artificial feeding, tend to discourage maternal nursing, with a final result, possibly, of increasing infant mortality. While the distribution of clean, pure milk is important, it should be realized that the instruction of the mother and continuous observation of the child play a vastly larger part. Everything possible should be done to encourage breast feeding and to aid it. The inexperienced mother is thus guided not by the advice of ignorant and superstitious relatives or friends, but by an intelligent and experienced person, who not only tells her what to do, but shows her how to do it. The expense of conducting milk depots and consultations upon a large scale is so great that private philanthropy cannot be expected to bear it. They should be supported by the municipality. In this way standardization of methods, proper supervision and coöperation may all be secured.

OPERATION OF THE MILK DEPOT AND CONSULTATION IN VARIOUS COUNTRIES.

The milk stations and infant consultations are operated somewhat differently in different places. In New York the station is in charge of a paid physician and has in summer two nurses and in winter one in attendance. Milk is distributed practically at cost and if the mother is too poor to pay, it is supplied by one of the relief agencies. The nurse visits the mother in the home and teaches her the method of milk modification. Consultations are held in most stations twice a week. One of the chief difficulties is to secure attendance of nursing mothers. Attendance of others is secured by the distribution of milk. During the past three years the needs of New York have been pretty well covered by milk stations. There were 79 in operation during 1911, and 77 since that time. These are open winter and summer. For the past two years about two-thirds of these have been operated by the Department of Health of the city, the remainder by private agencies.

In Paris,[25] also, the city is districted and the attendance is general. The infant consultations are often operated in conjunction with, or located in, the maternity hospitals, so that the work of the two is kept closely associated. A weekly stipend of a few francs is given to mothers to enable them to nurse their infants. This aids much in securing regular attendance. In addition to the milk depot and the consultation there exists in Paris what is known as "the canteen," which is a restaurant where any nursing mother can obtain a good meal for a nominal sum, or *gratis* if too poor to pay. The milk depot and consultation are widely found throughout the cities and smaller towns in France and about them center the activities for the reduction of infant mortality. Wherever they exist a marked reduction in the infant death rate has occurred. In some cities in France pensions are given by the municipalities to widows or other mothers with nursing infants where the family is dependent upon the mother's wages to enable them to remain at home and continue nursing.

Germany[25] has taken its ideas of methods for reducing infant mortality and the care of infants and mothers largely from France, and with the German genius for administration they appear to obtain better results, because the municipal authorities seem to have a stronger hold upon the public. The German campaign has been especially effective in dealing with the problem of illegitimate infants. The size of this class is so large and the death rate among them has been in the past so high, that in attacking the problem of infant mortality this has been a subject of primary consideration. In Berlin today the work for the reduction of infant mortality is managed partly by the municipality and partly by private beneficence, the two working in close cooperation. The channel of influence is chiefly the infant consultation, which is in charge of physicians and nurses. They are less numerous than in New York, there being last summer only seven of these in Berlin, distributed through the poorer districts of the city. Attendance is secured primarily from the birth registration; nurses visit the homes of the poor and invite married women to come to the consultations and bring their infants.

In the case of illegitimate children attendance is made compulsory by the city authorities, just as in New York is attendance upon the public school, and a truant officer is sent after the mother if she does not report regularly. A small weekly stipend is given which is deemed sufficient to supplement the family income to enable the mother to nurse her baby; the usual allowance is from one to four marks a week. This payment is in itself a very strong motive for regular attendance. When the baby is no longer nursed the stipend is reduced or withheld. Milk for artificial feeding is furnished at cost to those who are unable to pay for the same. Mothers with illegitimate children have different colored tickets from others who attend the consultation, so that they are readily distinguished by the physicians and attendants. And all the rules are much more stringently enforced in their case than with the other group of patients.

In Leipsic[26] the illegitimate child becomes at birth a ward of the municipality. From time to time its condition is inspected by public officers. It can be put out to nurse only with persons publicly authorized. It must be produced monthly at the municipal offices and examined. The result is that the death rate of illegitimate infants in Leipsic is just half that of other infants.

In England[27] the milk depot has not been very popular or successful. The expense attending the distribution of good milk has stood in the way of its extensive use, and dried milk or infant foods have in many places been substituted. The consultations, however, have attained much influence. To secure attendance a cup of tea is sometimes provided for the mothers at the consultations. This is regarded by them as a sufficient inducement and takes the place of the pecuniary reward which appeals so strongly to the thrifty German and French matron. If in England the measures referred to have been much less successful than in other countries, we must remember that in that country the care and feeding of the infant is generally believed to be the special province of the nurse. The physician is frequently not consulted at all. The effect of this is seen in the undue prominence given to nurses and social visitors in the work of the milk stations and the consultations, something greatly deprecated by the English physician.

As an instance of what can be done in a single community by stimulating public interest and a special incentive, the experience of Huddersfield, England, may be cited. In 1904 Mr. Broadbent, when elected Mayor, announced he would give a prize of one pound to the mother of every child born during his term of office who presented it living and well at the end of a year. A committee of ladies was formed to advise and visit the mothers. The death rate of infants in that district fell from 134 to 54 per 1,000.[26]

ORGANIZED VISITATION OF MOTHERS OF NEWBORN INFANTS.

Another important means for the reduction of infant mortality is by visits by trained nurses to the home of every poor mother of a newborn babe. This was first done extensively by

England. A statute known as "The Notification of Births Act"[27] was passed in 1907, making the registration of births within thirty-six hours compulsory. The old law allowed six weeks in which to make such returns. As soon as a birth was reported a visitor was sent to the home of every poor mother. If proper advice and assistance were needed visits were repeated. The infants were by these means brought to the consultations; when sick, they were visited by physicians. This plan has been extensively followed in London and many other large English cities, everywhere with striking results.

METHODS FOLLOWED IN NEW YORK CITY.

In New York the Health Department has a special corps of 191[28] nurses detailed for this work during the summer months. Immediately upon receipt of a birth notice, which must be filed within ten days, one of the nurses is sent to every tenement house home. Subsequent visits are made at the request of the mother, the midwife or the physician, if one is in attendance. These visits are usually welcomed and the early advice much appreciated, especially by young mothers. Each nurse has about 150 infants under her care and visits are made every ten days; oftener, if they are ill. Breast feeding is encouraged and assisted. It is estimated that the city has not less than 50,000 ignorant mothers. This use of the birth records is to be contrasted with a use formerly made of them, where they could be obtained, by the manufacturers of proprietary infant foods who used the information as a guide in distributing their circulars and samples.

While mothers are away at work the care of the baby so often devolves upon the older children of the family that Dr. Josephine Baker, Director of the Division of Child Hygiene of the New York Health Department, has organized among girls from twelve to fourteen years in the public schools a "League of Little Mothers." Its object is the teaching, during the summer months, of the principles of infant feeding and hygiene. This was founded in 1911. In different seasons it has had from 171 to 239 centers and an enrolled membership which has varied between 15,000 and 20,000.[28] They have weekly meetings, talks are given by physicians and nurses, and examinations are held and medals awarded at the end of the season to the members of each league who have been most successful in applying their knowledge. The amount of interest awakened by this organization in the care of infants has been remarkable. The girls learn easily and are most eager to put their ideas in practice. What this will mean when a dozen years hence these girls become mothers, who dare prophesy! This movement has in it possibilities for betterment in the future which are almost without limit.

Nowhere in the world does the problem of infant mortality present greater inherent difficulties than in New York, from the heterogeneous character of the population and an overcrowding which in certain districts is not equalled in any city in the world. European capitals—London, Paris and Berlin—really know very little about the severe intestinal diseases which carry off infants in such numbers in New York, Philadelphia and our other large cities. What has been accomplished in New York is so conspicuous that the methods followed may well be taken as a guide to other cities and may be described in some detail.

Up to the year 1902 the work was somewhat desultory; the Department of Health had confined its efforts to the three summer months, the chief thing done being the employment of a special corps of physicians to visit sick infants in the tenements. That year the work was greatly enlarged and visiting nurses were employed to follow up cases. Inspection of milk on a considerable scale was begun. During the next six years more and more private organizations came into the field aiming to better child conditions in the city, and together a good deal was accomplished.

The real campaign against infant mortality, however, may be said to have begun in 1908, when the Division of Child Hygiene of the Health Department was organized, to which all the work done by the Department for infants was entrusted. An attempt was made for the first time to coördinate the different agencies working in the city for the same end, by a series of conferences on the Summer Care of Babies, which were largely attended. The summer corps was increased to a force of 28 paid medical inspectors and 111 nurses. The city was divided into 89 districts and an effort was made to reach all sick infants in the poor districts. For the first time visits were made by nurses to tenement homes in which births were reported, and instruction and advice given. Talks to mothers were given in many centers on the hygiene and feeding of their infants and much literature distributed. The campaign was continued for four and one-half months in the place of three months as formerly. Seven milk depots were opened by the New York Milk Committee, and others by private agencies.

Work along much the same lines was continued during 1909 and 1910, each year witnessing better organization and more effective service. By 1911, most workers in this field having become convinced by the experience of the last three or four years of the value of the milk depot as an agency for saving babies in summer, an increased number of such stations were opened.[29] In all, 79 were operated throughout the season—15 by the Health Department, 31 by the New York Milk Committee and 33 by various other organizations or by individuals. Some 150 different bodies working for child welfare or public health were federated in an Infant Welfare Association, thus securing harmony, coöperation, preventing duplication of effort and fixing standard methods of working and of recording results. This organization, afterward known as "The Babies' Welfare Association," has been, and still is, a powerful factor in the results obtained in New York. It has unified effort, and, through its efficient secretary, it has enlisted the coöperation of the press and done much to arouse public interest and shape public policy.

WHAT HAS BEEN ACCOMPLISHED IN NEW YORK.

The results shown at the end of the year were a surprise to even the most sanguine. For the preceding seven years the average infant mortality had been 16,527; only once was it below 16,000, and it had been as high as 24,000. In 1911 it fell to 15,030, a reduction of 1,184, or nearly 8 per cent. from the previous year.

During 1912 essentially the same campaign was waged not only during the summer months, but throughout the year. This season the majority of the milk stations (55 out of 77 operated) were taken over by the Health Department. The remarkable record of the previous year was again lowered. The total infant deaths for the year were but 14,289, a reduction of 741, or nearly 5 per cent. from the low figures of 1911.

Could the results of 1911 and 1912 be repeated in 1913? Many were skeptical, not a few thought it impossible. The year has not yet closed, but for the first ten months, ending November 1st, and including the period of highest mortality, the records of the two previous years have been surpassed. For this period there have been 492 less deaths than in 1912 for the same months.

The results above mentioned are even more striking when the rate is taken in comparison with the infant population for the different years:—[28]

In 1880, the infant death rate was 288 per 1,000 of living infants.
In 1902, " " " " " 168 per 1,000 " " "
In 1908, " " " " " 144 per 1,000 " " "
In 1911, " " " " " 120 per 1,000 " " "
In 1912, " " " " " 109 per 1,000 " " "
In 1913, " " " " " 102 per 1,000 " " " (estimated from records of first ten months).

These results have not been accidental. They have been brought about by hard work enthusiastically carried on, but most of all by a carefully planned campaign in which the resources of the city have been concentrated upon a definite object. Furthermore, it must be added, by liberal appropriation on the part of the city authorities; without this such results would, I believe, have been impossible. What has been accomplished in New York has been approached in other cities of the United States, and just in proportion to the extent of the operation of life-saving agencies similar to those used in New York. Thus, while New York has shown for the first ten months of this year a reduction of 4 per cent. from last year, Chicago for nine months shows an increase of 5 per cent. and Philadelphia an increase of over 11 per cent. from 1912.

The essential parts of New York's campaign have been:—

Visits by trained nurses to the homes of ignorant mothers of newborn babies.

Extensive development of the milk depot and infant consultation.

Federation in one organization of all the agencies engaged in infant welfare work.

Efforts in other cities to be successful must be made along these or similar lines. The time when individual effort can cope with this problem has passed. The present conditions call for an organized campaign, planned on scientific lines and carried out with business-like efficiency. Only such effort can meet the complex situation as it exists in our large cities today.

ESSENTIALS IN AN INFANT MORTALITY CAMPAIGN.

The general motto must be, as often said: concentrate effort on the mother; assist maternal nursing whenever possible by a stipend or by pensions when necessary. If artificial feeding becomes necessary the mother must be taught it with patience and intelligence. But whether nursed or fed, infants must be kept for the first year under close and continuous observation of trained workers. The time was in the not distant past when if parents did not choose to send their children to school they were allowed to keep them at home, and even put them to work. Modern public opinion, however, has decreed that in a sense the child is the ward of the State and ignorant parents are no longer to be allowed to exercise their parental rights in such matters. The State steps in and assumes to decide how much schooling a child shall have and to see that he gets it. Until recently also the authority of parents over the health of children and the control of conditions which affected it was considered to be unquestioned, and only in matters of contagious disease did authorities interfere. But we are now coming to see that the child belongs to the State in this respect also, and that the right of a mother to neglect or starve her infant or feed it bad milk may come to be regarded as an offence against society such as we now regard absence from school. What parents will not do voluntarily the State will either compel them to do or will step in and do for them. Infants will not be permitted to die from neglect and bad feeding, nor will conditions be tolerated which make it possible that a large percentage of infants who grow up in cities live in such surroundings that health and normal physical development is simply impossible.

We have seen the early disregard of infant rights and the indifference with which society regarded infant life. We have traced the gradual growth of the idea that the child was valuable to society, to the State. We have seen how little was accomplished to save infant life through efforts which were guided by human sympathy and pity alone.

What they have failed to do modern science and organization have accomplished. By them the seemingly impossible has been achieved. What of the next step? Our work is to be largely a campaign of education, which shall carry into every city and town of the land a knowledge of what can be done and how to do it. That is the chief function of this Association—to create a public opinion which shall make such an infant death rate as has been seen during recent years in many of our manufacturing cities never again possible. Such conditions are not only a stigma upon that especial community, but a disgrace to the country at large. Looking at the magnitude of the problem presented by infant mortality in our large cities today, we, who are working for better conditions, stand aghast at the difficulties which confront us, but a review of the great advances which have been made in recent years gives us new courage and new hope for the future. We have seen in the last twenty-five years more accomplished in this direction than had been done in the previous two hundred and fifty years; I think one might truthfully say in the previous fifteen hundred years.

Does God fix the death rate? This question has recently been raised in several journals. Once men were taught so, and death was regarded as an act of Divine Providence, often inscrutable. We are now coming to look upon a high infant death rate as evidence of human weakness, ignorance and cupidity. We believe that Providence works through human agencies and that in this field, as in others, we reap what we sow—no more and no less.

The motto of the New York Health Department should be the creed of all interested in this subject: "Public health is purchasable; and within certain natural limits each community may determine its own death rate."

BIBLIOGRAPHY.

1. 69th and 73d Annual Reports, Registrar-General, London, 1908 and 1912.
2. Position of Woman in Ancient Greece and Rome, James Donaldson, New York, 1907.
3. La Protection de la Première Enfance, J. A. Duché, Paris Thèse, 1909.
4. Essai sur L'Histoire des Enfants-Trouvés, M. de Gouroff, Paris, 1829.
5. Diseases of Children, Underwood, London, 1806.
6. Sur la mortalité des Enfants du Premier Age, J. Comby, Le Progrès Médical, 1885.
7. La Mortalité des Enfants Nouveau-Nés dans les Differents Pays, Congrès International d'Hygiène, Vol. I., Paris, 1878.
8. Considerations sur les Enfants-Trouvés, Benoiston de Chateauneuf, Paris, 1824.
9. Observations on the Mortality and Physical Management of Children, John Roberton, London, 1827.
10. The Infant, the Parent and the State, H. Llewellyn Heath, London, 1907.
11. Infant Mortality, George Newman, London, 1906.
12. Some of the More Prominent Causes of Excessive Infant Mortality, William Moore, Dublin, 1861.
13. Medical Essays, Thomas Percival, Warrington, England, 1789.
14. Archives Générales de Medecine: 10, 1826, p. 461.
15. Historical Sketch of Medicine and Surgery, William Black, London, 1782.
16. Essay upon Nursing, William Cadogan, London, 1749.
17. A Cursory Inquiry into Some of the Principal Causes of Mortality among Children, John Bunnell Davis, London, 1817.
18. Mortality of Children in the Principal States of Europe, William Farr, Journal Statistical Society, Vol. XXIX., London, 1866.
19. Essay on Milk, Robert Hartley, New York, 1842.
20. La Origine de la Crèche, Revue Philanthropique, Vol. IV., 1898-99.
21. Mortalité des Enfants Nouveau-Nés, Congrès International d'Hygiène, Vol. I., Brussels, 1876.
22. Dangerous Trades, Thomas Oliver, London, 1902.
23. Infant Mortality and Necessity of a Foundling Hospital in Philadelphia, John S. Parry, Social Science Association, Philadelphia, 1871.
24. Infantile Mortality and Infants' Milk Depots, McCleary, London, 1905.
25. Dr. L. E. La Fetra, personal communication.
26. The Children of the Nation, John E. Gorst, New York, 1907.
27. Phases in Development of Infant Welfare Movement in England, Janet Lane-Claypon, Trans. 15th International Congress on Hygiene, Vol. III., Section III., Part 1, Washington, 1912, p. 388.
28. Reduction of Infant Mortality in N. Y. City, Josephine Baker (*ibid.*), p. 139.
29. Infant Mortality and Milk Stations, Special Report of Committee for the Reduction of Infant Mortality of the N. Y. Milk Committee, 1912. Edited by Philip Van Ingen.

HEAT AND INFANT MORTALITY.*

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By far the most conspicuous phenomenon in connection with the mortality of infants is the well-known increase in the number of their deaths which takes place in the summer months. No incidence of death in any other age group seems to be so immediately determined by meteorological conditions.

Hot summers produce an abnormally high infant death rate and cool summers the reverse. For instance, Kruse[30] points out that the infant death rate in German cities of over 15,000 inhabitants decreased from 190 in 1901 to 153 in 1910, a cool year. Yet, the universally hot summer (in Europe) of 1911 was accompanied with a great rise in the infant mortality, so that the infant death rate in these cities for that year was 187, a rate not surpassed by any year subsequent to 1901.

Again, Liefmann and Lindemann[38] state that the total number of infants dying in Berlin in July and August, 1910, was 1,439, while, in the same months of 1911, 2,050 died, an excess of 611.

The relation of heat to the summer deaths of infants has naturally been the subject of much statistical inquiry. Forty years ago, no doubt existed, in this country at least, as to the direct effect of heat in causing increased infant mortality in the summer. The discoveries and developments in bacteriology and the etiology of infectious diseases, however, gradually displaced heat into the background as a direct factor in the deaths of infants during the summer time. Until a few years ago the general opinion has prevailed, that while summer heat stood in casual relation to summer deaths, that this relation was by no means immediate. Heat was regarded as an agent calling other deleterious influences into action.

Recent observations, however, particularly those in Germany, of Finkelstein,[9] Rietschel,[54, 55, 56, 57] Liefmann and Lindemann,[37] Klose,[28] Kathe[25] and others have reopened the question. We must now ask ourselves if summer heat is not, after all, by its direct action the determinant of a large part of the summer mortality of infants.

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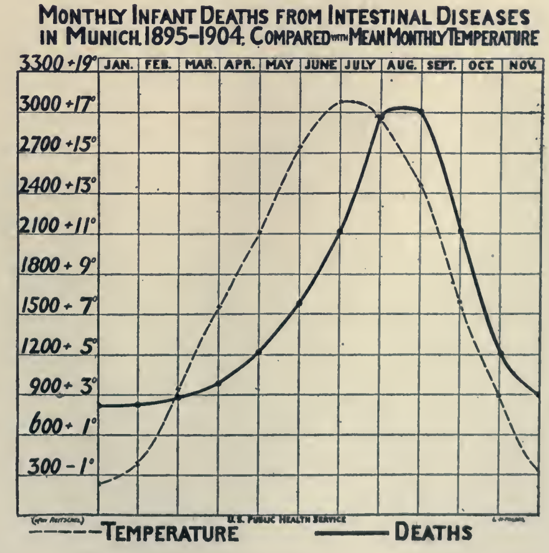
* Read before the Pediatric Section of the American Association for Study and Prevention of Infant Mortality, Washington, D. C., November 14, 1913.

It is to be regretted that the recent careful studies which have been undertaken abroad have not been duplicated to any great extent in this country, and that it has been necessary to derive most of the material for this paper from foreign sources.

It has naturally been found impossible, within the limits of this article, to give complete treatment to the subject, but an endeavor has been made to summarize the more important observations.

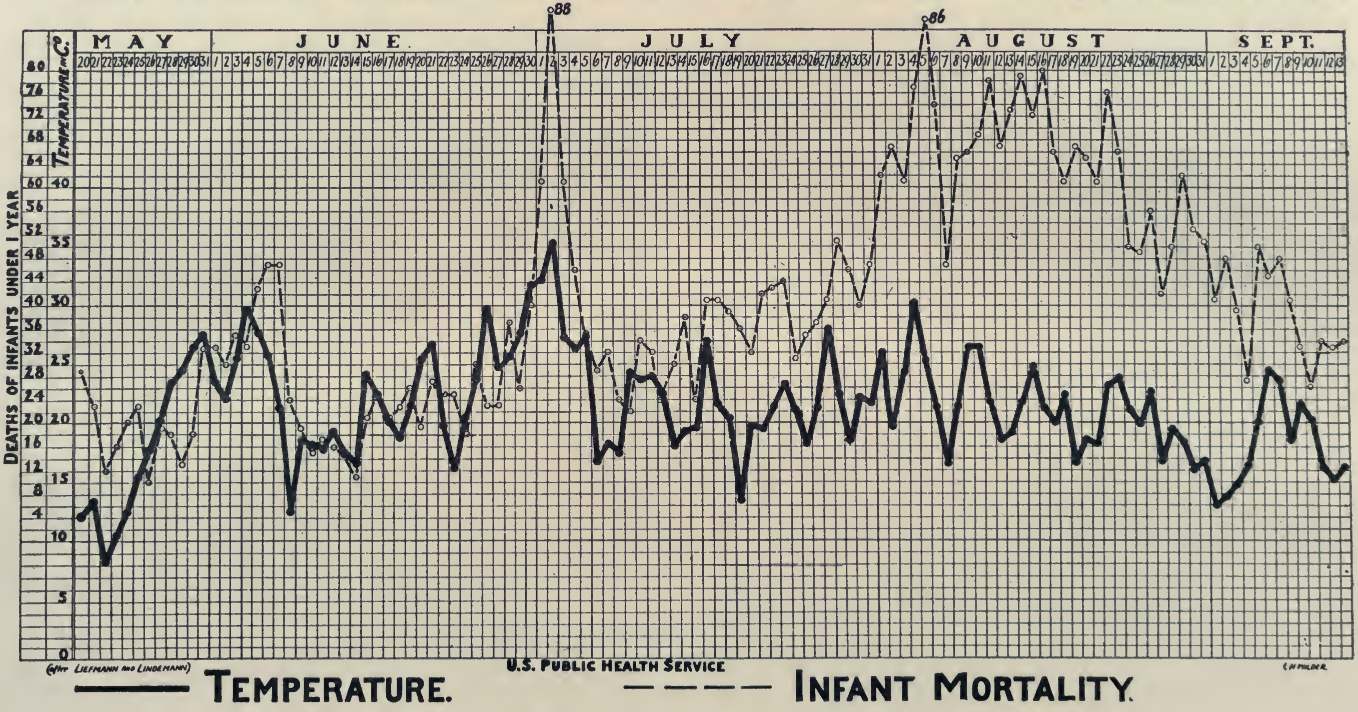
RELATIONS OF THE SUMMER MORTALITY OF INFANTS TO THE TEMPERATURE CURVE.

In the past, numerous comparisons have been made, and many charts published, showing the relation of temperature to infant deaths. Owing to the great prevalence, in the summer, of deaths from intestinal diseases in babies, such curves have dealt mainly with the relation of temperature to deaths from this cause. Moreover, the *mean* temperatures for weekly or monthly periods have been the values taken with which to compare the infant deaths occurring in like periods.



The resulting curves are of a type familiar to us all. As an example, let us look at the following chart (Chart I.) from Fuerst.[54] This chart shows the monthly deaths of infants from

BERLIN, 1905.—DAILY DEATHS OF CHILDREN UNDER 1 YEAR COMPARED WITH THE DAILY TEMPERATURE AT 2 P.M.



(after Liefmann and Lindemann)

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gastrointestinal diseases in Munich from 1895 to 1904, as compared with the mean monthly temperatures.

It will be seen that the death curve lags behind the temperature curve, rising steeply to its apex in August and declining at a later period than the temperature curve, to reach the winter normal in December.

It was pointed out by Miller[43] in this country, so far back as 1879, that we cannot make reliable deductions from comparisons of this character. If we wish to study the direct effect, if any, of heat upon infant mortality, we must compare the daily deaths with the daily temperatures. More recently this was pointed out by Prausnitz,[52] Finkelstein,[9] Willim,[63] Liefmann and Lindemann,[37] Schwarz[69] and others. Willim and Finkelstein seem to have been the first to publish such curves, but the most careful study of this nature in recent literature is that of Liefmann and Lindemann, which deals with the relations of heat to infant mortality in Berlin for a period of fifteen years.

Let us now examine one of Liefmann and Lindemann's* charts (Chart II.), which shows the relation of the daily infant deaths to the daily temperatures, in Berlin, during the year 1905, which was characterized by some hot weather for that latitude.

According to these authors, in the spring of that year the daily infant deaths were between 15 and 20. Had this rate been kept up throughout the year some 7,000 babies would have died. As a matter of fact, there were about 10,000 deaths of infants, the excess being almost entirely due to increased mortality in the summer. On certain days the mortality was so high that it was two or three times the norm.

An examination of this chart shows two striking peculiarities: First, two sharp prominences with their apices on the 7th of June and the 2d of July respectively, and, second, a high and broad elevation in August, crowned with a succession of smaller secondary prominences.

Liefmann and Lindemann distinguish two elements in their curves—(*a*) the early summer mortality and (*b*) the late summer mortality.

Early Summer Mortality.—On inspection it is seen that there is a striking parallelism between the temperature curve and the mortality. This is especially manifest in the sharp increase in the number of deaths on June 30th and July 1st, accompanying the high temperature on those dates.

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* A careful study of their work is recommended as well as of Rietschel's comprehensive monograph on this subject. I am indebted to these authors for much of my material.

This parallelism is manifest not only on the hottest days, but the moderate heat of the 4th and 5th of June, also, is sufficient to provoke an increase in the deaths recorded.

An interesting circumstance, developed from the study of this and other curves in their series, is that, generally speaking, only temperatures of considerable height (22° to 25° C.) are effective in provoking an increase in the infant deaths. Often the first hot wave does not call forth the expected response.

The Late Summer Mortality.—The late summer mortality corresponds to the high and broad curve of deaths from the middle of, or end of, July to the last of September. This portion of the chart presents a different relation to temperature than that corresponding to the early summer. The high mortality present in the first part of August no longer recedes to the norm with falling temperature. On the contrary, it remains great in spite of the interpolation of periods of cool weather of some duration. Nevertheless, rises in the temperature provoke an increase in the number of deaths which serves to give this curve its jagged outline.

The mortality curve in this portion of the summer seems to express the summation of the effects of a long period of warm weather, as a basis, combined with the exacerbations provoked by repeated sudden increases in the temperature.

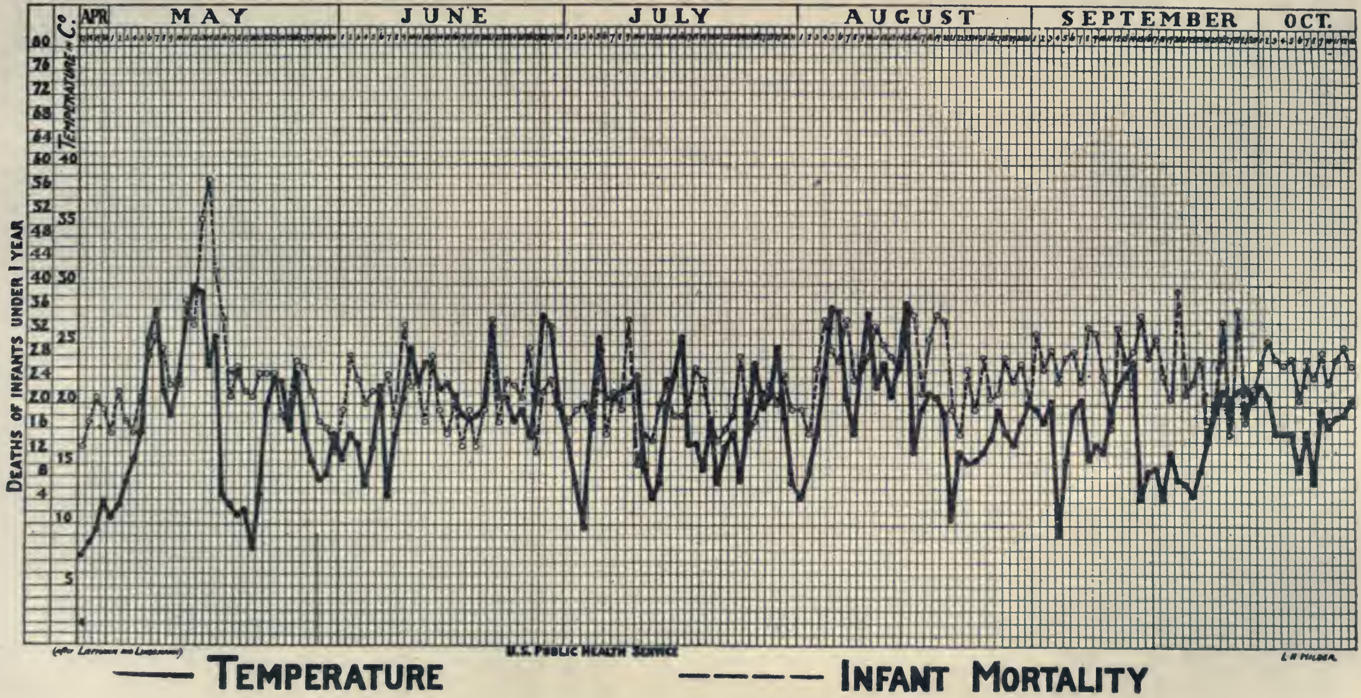
Curves of a Cool Year.—If now we examine these curves for a cool year we find a different set of relations. Chart III. shows these conditions during the year 1907, a cool summer with only one hot period in May.

We see, upon examination, a response to the hot weather of the 7th and 12th of May, but, owing to the very moderate temperature prevailing throughout the rest of the year the broad mid-summer rise in the mortality curve is practically absent.

CHARACTER OF DEATHS IN THE EARLY AND LATE SUMMER.

The differences in the reaction of the mortality curve to temperature in the early and the late summer are accompanied by differences in the nature of the infant deaths recorded. According to Liefmann and Lindemann an examination of the death certificates showed that, in the early summer, a large

BERLIN, 1907.—DAILY DEATHS OF CHILDREN UNDER 1 YEAR COMPARED WITH THE DAILY TEMPERATURE AT 2 P.M.



(after Liefmann and Lindemann)

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number of deaths were recorded with acute symptoms not referable to the intestinal tract.

For instance, of the 88 infants dying on the hot day of July 2, 1905, only 16 died of intestinal diseases, while in 52, or about 60 per cent., the cause of death was given as convulsions, brain stroke and heart failure, or, in other words, with symptoms mainly referable to the central nervous system.

As the summer progressed, however, the number of deaths from gastrointestinal diseases gradually increased, so that, toward the end of August and the beginning of September, from 72 to 78 per cent. of the diagnoses on the death certificates gave this class of diseases as the cause of death. Hot days brought an increased number of certificates recording deaths with acute symptoms, and a number of such deaths were found, even in comparatively cool weather, at this period.

A considerable difference in the duration of illness was apparent. In the early part of the summer about 50 per cent. of the infants died after an illness lasting only one or two days, while in the latter part only about 20 per cent. died with such acute symptoms. The remainder succumbed to illness of a more chronic character.

The following tables from Liefmann and Lindemann give a good idea of the relative frequency of deaths with acute symptoms and from gastrointestinal diseases in the various parts of the summer (Table I.) and the course of the mortality from gastrointestinal diseases during the summer of 1905 in Berlin:—

TABLE I.

Types of mortality during different parts of the summer. Berlin, 1905.

1905.	NUMBER OF INFANTS DYING EACH DAY.		
	In the cool part of early summer.	In the hot part of early summer.	In the cool part of late summer with high mortality.
Gastrointestinal diseases ...	3.0	13.2	41.3
Congenital debility and atrophy	6.0	6.2	4.3
Other affections including,	12.6	43.7	25.3
Convulsions, brain stroke and heart failure	7.7	32.7	20
	21.6	63.1	70

(Liefmann and Lindemann.)

TABLE II.

Weekly deaths from gastrointestinal disease, in Berlin, during the summer of 1905 (after Liefmann and Lindemann).

1905.	Total Infant deaths.	Deaths from gastro-intestinal diseases.	
		Number.	Per Cent.
1. Cool part of early summer (May 14-20)	171	25	14.5
2. Hot part of early summer (June 4-10)	228	66	29
3. Cool part of early summer (June 11-17)	125	41	33
4. Hot part of early summer (July 2-8)	315	148	47
5. Hot part of late summer (July 30-August 5) ...	441	306	69
6. Cool part of late summer (August 13-20)	498	389	79
7. Cool part of late summer (August 27-September 2)	237	250	72
8. Cool part of year after decrease in mortality (October 1-7)	168	67	39

(Liefmann and Lindemann.)

We see from the foregoing that the march of infant mortality in the first part of the summer is characterized by the great number of deaths with acute symptoms and short duration (24 to 48 hours) while, later, the high broad and slowly descending curve is largely produced by the deaths of infants who succumb to more or less subacute affections, mainly of the gastrointestinal tract.

The influence of heat upon the mortality of infants in the first part of the summer is apparently immediate. In the latter part of the summer this no longer seems to be the case. At first sight one would be inclined to state that, while some causal relation is manifest, the late summer mortality of infants is not directly influenced by the heat, which, therefore, can stand in no immediate relation to this phenomenon.

A closer examination, however, shows that we can, by no means, suppose that infants are necessarily relieved from the action of heat by reason of the comparatively long remissions of the temperature in the latter part of the summer. If we are to examine the effects of heat upon infants we cannot arrive at conclusions by considering outdoor temperatures only. The nursling passes most of his time indoors and it is the indoor meteorological conditions to which he is mainly subjected.

Indoor Temperatures.—The credit of calling attention to the importance of indoor temperatures belongs to Flügge[11] who, in 1879, published a series of observations upon indoor temperatures in mid-summer. He found that the temperature, indoors, was dependent upon the degree of heat received by the walls from the sun.

The diffusion of the heat through the wall was found to be relatively slow, so that their inner surfaces reached their maximum temperatures in the following order: East wall, 9 P.M.; south wall, 12 midnight; west wall, 3 A.M.

The effect of the radiation of heat from the inner surfaces of walls, protracted far into the night, was to maintain the indoor temperature at a level considerably in excess of that of the external air. During a relatively cool summer Flügge found that the mean indoor temperature might exceed the exterior by as much as 9.5° C. (17.1 F.)

Other observations on the indoor temperature have been made by Meinert[41, 42], Hammerl[16], and Rietschel[55] in Germany; in this country by Chapin,[4] Knox[29] and Helmholz.[19]

Meinert[41, 42] observed an average excess of 8.9° C. (16° F.) of the indoor over the outdoor temperature in a room in Dresden in which an infant had died of summer diarrhea.

Hammerl[16] made observations in the dwellings of workmen and found that the average mean indoor temperatures were greatly in excess of the outdoor. In one instance the temperature never fell below 24° C. (75.2° F.) for a period of over fourteen days and often rose to 32° C. (89.6° F.) and on one occasion to 35° C. (95° F.) with outdoor temperatures that never exceeded a maximum of 23.7° C. (74.6° F.)

In the cool summer of 1910, Rietschel[55] made observations with maximum and minimum thermometers and recording thermographs in dwellings in Dresden, in which, for the past five years, a high infant mortality had been recorded.

He states: "I admit frankly that the results astonished me. I had indeed supposed, that in such dwellings, temperatures of considerable height might prevail in summer, but I had never expected that such excessive temperatures could be maintained, not only daily but weekly, with an outdoor temperature relatively so low."

In some instances the temperature rose to 35° C. (95° F.) and 37° C. (98.6° F.) with outdoor maximums of but 23.5° C. and 21° C. (74.3° F. and 69.8° F.) During the hot summer of 1911 he reports an instance in the home of a workman, of maximum temperatures of 38° C. (100.4° F.) with minima of 30° C. (86° F.)

Similar measurements have been made in this country by Chapin,[4] Knox[29] and Helmholz[16] during the summer of 1912 with like results. Helmholz observed, in the stockyards district of Chicago, maximum indoor temperatures 30° F. in excess of the outdoor maximum. Minimum temperatures below 80° F. were rather infrequent, occurring only 83 times out of 1,374 maximum and minimum readings.

It is clear from the foregoing that infants are often obliged to endure, for considerable periods, temperatures which are greatly in excess of those of the external air. Moreover, the effect of these temperatures is often enhanced by excessive clothing and rubber diapers. It is a too frequent experience to find, in crowded tenement homes, the busy mother keeping the baby in the kitchen, often near the stove, in order to have it close at hand.

Effects of Humidity.—The influence of a high degree of moisture in the air in increasing the effects of heat is well known. It would naturally be expected that hot days with high humidity would show the greatest increase in infant deaths. The observations on this point are inconclusive. Days on which great infant mortality has been recorded have, for the most part, been hot and dry.

Meinert,[41] Prausnitz,[52] Liefmann and Lindemann[37] and others point out that the relative humidity of the external air is by no means an index of the moisture to which infants are exposed. In the dwellings of the poor, where the great majority of infant deaths take place, the infant passes a large part of his time in narrow and usually crowded quarters, where the relative humidity may be greatly raised by the lack of ventilation, the moisture derived from the breath and skin of numerous inmates (frequently five or six in a single room), and the water evaporated in cooking, ironing and washing.

Indeed, Kubly's[31] observation (cited by Meinert) showed that in the dwellings of the poor in Dorpat, a mean relative humidity of 83 per cent. was found in 223 observations and, in thirty instances, 90 to 98 per cent. was recorded. Knox's[29] observations in Baltimore during the summer of 1912, showed the relative humidity in such dwellings to vary between 70 and 80 per cent.

Circulation of Air.—It is evident that circulation of the air is of great assistance in eliminating heat from the body by accelerating evaporation. I will cite only the recent experiments of Flügge and his co-workers, Paul, Ercklentz and Heymann.[13] They showed that in stagnant air, symptoms of heat retention begin to make their appearance at temperatures of 24 to 25° C. (75.2° F. to 77° F.), which, however, disappeared when the air was set into motion by a fan.

If, then, heat is to be regarded as a direct factor in the causation of summer infant mortality, we would expect to find an increased number of deaths of infants in houses and in sections of cities where conditions are unfavorable to the circulation of air. Such we find is the case.

Ballard,[1] in his extensive investigations of summer mortality in England, noted that when the wind had free access to houses the summer infant mortality was low, while it was high in those cities, or sections of cities, where, from the disposition of the streets or houses, they could not be swept by the prevailing winds in summer.

Meinert,[41] to whom belongs the credit of being the first to investigate, in Dresden, the relation of housing conditions to the summer mortality of infants found, that in practically every instance, in the case of 580 infants dying in the eleven summer weeks of 1886, the conditions were such as to prevent the free circulation of air in the rooms in which these children lived. In only one instance did any of these infants die in a house exposed freely on all sides to the wind. The infants died in those dwellings which, from their low-lying situation, their location in the rear of other dwellings, the presence of courts, narrow streets and shut-in style of architecture, were denied the access of cooling breezes; or, from the disposition of the windows, thorough ventilation was impossible.

Thus on low-lying Hechtstrasse, with shut-in houses and many courts, 18.49 per cent. of the living children under one year died;

on high-lying Kiefernstrasse, with a more open style of architecture, only 2½ per cent.; upon Johan Meyer Strasse with model workmen's homes, open to the air on all sides, none.

Prausnitz[52] points out that in the absence of thorough ventilation, the only exchanges which can take place between the inside and the outside air arise through differences in their temperatures.

In the absence of thorough ventilation these differences of temperature are so slight, in hot weather, that stagnation readily takes place. He and his co-workers investigated in Graz the location of windows in dwellings in which infants had died of summer diarrhea during the years 1903 and 1904. A dwelling was regarded as susceptible of through ventilation when it possessed windows in opposite walls, as partially so when the windows were in walls at right angles to each other, and as not susceptible, when windows in one wall only were found.

They obtained the following results:

Year.	Susceptible of through ventilation.	Partially susceptible of through ventilation.	Not susceptible of through ventilation.
1903, 1904	15.4 per cent.	19.5 per cent.	65 per cent.

It will be seen from the above that approximately 80 per cent. of these dwellings did not present conditions favorable to a free circulation of air.

Other Housing Conditions.—Besides Meinert's former work other careful studies of housing conditions in relation to housing have been made. Among these may be especially mentioned those of Willim[63] in Breslau, of Liefmann[34] and of Kathe[25] in Halle, and Liefmann and Lindemann[38] in Berlin. These investigations all bear testimony to the great influence housing conditions have upon infant mortality, and, particularly, the conditions favoring high indoor temperatures or the absence of free circulation of air.

While it is true that the conditions were often such as would favor the dissemination of infectious disease as well, we encounter the paradox that certain conditions, intrinsically unhygienic, have a distinctly favorable influence on the summer mortality of infants.

Thus it was found by Meinert, Willim and Liefmann and

Lindemann that infants living in basements and cellars show a smaller increase in their summer death rates than do breast-fed infants; while, with respect to the other stories, the death rate usually increases as we go up, being found highest next to the roof. (Meinert found the greatest number of deaths in the ground and first floors.)

Liefmann's and Kathe's investigations in Halle showed that the summer mortality of infants was rife, not only in certain streets, but in certain houses. Thus Liefmann found that out of 380 streets which Halle possessed at that time, no less than 141 or over 37 per cent. had no infant deaths.

We can also readily conceive from the character and situation of the houses in which infants die that, once they are heated through by the warmth of the early summer, the heat stored in the earth, pavements and walls, in their shut-in location, prevents any substantial cooling off in the late summer, in spite of periods of moderately cool weather. In the early summer, before there is much stored heat, remissions in the external temperature have a much greater effect.

Effects of Heat in Causing Death.—It must be clear, from the foregoing, that the greater the summer heat the greater the number of deaths, and that it is an indoor and not an outdoor climate to which infants are exposed. There remains for discussion the manner in which their deaths ensue. There are two hypotheses by which these are usually explained.

I. Owing to the fact that the great majority of infants dying in the summer are bottle-fed, the deduction is logical that the onus of their deaths must be placed largely upon the food most generally used in the artificial feeding of infants, namely, cow's milk, which becomes so readily spoiled by the summer heat when carelessly produced and handled.

We find two views generally held to explain the pernicious action of cow's milk in the summer:—

(1) That as a result of careless handling and inadequate cooling on the part of the producer and the consumer, the germs which always contaminate cow's milk undergo such proliferation that the ordinary saprophytic bacteria in milk, or their toxic products, endanger the life of the artificially fed infant.

(2) That the deaths of artificially fed infants are not due solely to the use of a germ-laden milk and the resulting poisons, but that the use of an alien food creates a predisposition to in-

fection with pathogenic bacteria which may be acquired in other ways than through the milk, as, for example, through contact or by the agency of flies.

II. A second hypothesis, held in this country some thirty-five years ago, and advanced anew by Meinert in 1881, is that heat itself by its various effects upon the infant organism must be regarded as the chief factor in the summer mortality of infants. This theory has recently gained many adherents abroad, such as Rietschel, Finkelstein, Liefmann and Lindemann, Kathe, Klose, Prausnitz and others.

I will endeavor to discuss as briefly as possible these hypotheses.

Effects of Stale or Germ-laden Milk.—Milk is so plentifully seeded, during the course of its production and handling with germs of all kinds, their multiplication is so favored by temperatures in excess of 60° F. and the possibilities of transmitting disease through its use are so obvious that none can deny its agency in this respect. Indeed, the accumulating literature of the epidemics of typhoid fever, the paratyphoid affections, diphtheria, scarlet fever and septic sore throat transmitted through the agency of milk, not to mention the frequent presence of the tubercle bacillus in milk and milk products, only serve to emphasize the necessity of rigidly controlling the production and handling of this great source of food.

The most extensive investigation of recent years as to the effects of feeding different kinds of milk to infants is that of Park and Holt[49] in New York. Six groups of infants were observed, respectively fed on cheap store milk, condensed milk, milk from a central distributing station, good bottled milk, the best bottled milk and breast milk.

During the winter but little differences in the result were noted, no matter what milk was fed. During the summer, however, the differences were striking. The infants fed on breast milk and the best bottled milk showed the best results, while these were very bad in the case of the infants fed on the condensed milk and the cheap store milk.

Rietschel, Liefmann and Lindemann and others, however, advance the following reasons to show that the influence of cow's milk in causing summer infant mortality has been overestimated:

1. The hypothesis that the ordinary saprophytic germs of milk produce disease and death in infants is singularly lacking

in experimental confirmation. The most exhaustive and complete experiments of this kind, *i.e.,* those of Flügge,[12] show that, at most, only the peptonizing bacteria in milk may have some harmful action and are capable of exciting diarrhea when fed to dogs in large quantities.

2. Milk epidemics reported in the literature are mass epidemics like other food epidemics. All the individuals, irrespective of age, who took the milk were affected. Their course has also been quite different from that of the summer diarrhea of infants.

3. The use of sterilized milk ought to have a very great influence in reducing summer infant mortality. This does not seem to be the case. For instance, Liefmann[34] reports that infants boarded out in Halle have been provided since 1904 with sterilized milk by the municipality, yet the summer mortality among them from gastrointestinal disease has been the same or somewhat greater than that prevailing for the rest of the city infants. Out of 384 infants supplied in this way during 1905, 1906 and 1907, forty-five or about 12 per cent. died, of which number thirty or 8 per cent. died of intestinal diseases. Moreover, it has been a common clinical experience to see infants who have received nothing but the purest cow's milk, from a bacteriological standpoint, sicken with all the symptoms of typical summer diarrhea.

4. The increase in the summer mortality of infants seems to be initiated only by temperatures in excess of 24° C. While it is true that multiplication of germs in milk is greater at 30° C. than 24° C. it cannot really be maintained that milk will not spoil almost as effectively at the latter temperature as at the former. Yet why should milk spoiled at 24° C. not increase mortality, while milk spoiled at 30° does?

5. Finkelstein and Liefmann and Lindemann point out that on hot days a large part of the mortality ensues within twenty-four to forty-eight hours. Liefmann and Lindemann state, in this connection: "It is difficult to conceive how the spoiling of the milk, the infection of the intoxication of the child, the sickening and, finally, the death, can be compressed all within a single day."

While it is true, in the case of the investigation of Park and Holt, that the infants who received the cheap store milk showed the worst feeding results, there are certain circumstances, noted by the investigators which must be taken into account in weighing the conclusions.

For instance, the results of feeding with condensed milk, in which the bacteria were found to be relatively few, gave results but very little better than that obtained with the cheap store milk. Again we are told that the store milk was boiled and subsequently kept on ice in the majority of instances. The results of the laboratory examination of numerous strains of bacteria isolated from the milk showed only one or two strains that produced diarrhea when fed to kittens.

The environment of the children was not the same, those using the store milk belonging to a poorer and needier class. It is just this class of the population who crowd into the smaller tenement quarters with windows opening on courtyards and light wells.

Moreover, the investigators themselves state, "There seem to be many factors, but a consideration of the facts accumulated indicate that heat is the primary factor and bacteria and their products a secondary one except when the contamination is extreme or the pathogenic organisms present." And again, "The depressing effects of great atmospheric heat, *i.e.*, a temperature of 90° F. or over, were very marked in all infants, no matter what their food. Those who were ill were almost invariably made worse and many who were previously well became ill." They also indicate that proper *care* was after all the most important factor in keeping the infants well. With proper care some infants were fed successfully all summer on the cheap store milk.

That stale milk is not always deleterious to infants when the environment and care are good is shown by Rietschel's[57] experiments. Rietschel, after experimenting upon himself, fed to a series of infants cheap store milk which had previously been heated (as is the universal custom in Germany) and then allowed to stand in an open vessel for twenty-four hours at room temperature in the summer. The infants for the most part did very well on this diet and showed not the slightest trace of disturbance. In a few instances he had the impression that such a milk could cause more readily loose stools than a milk poor in bacteria. The milk was often turned when fed to the infants.

One further point which must be noted is that the infants which show the least increase in their death rate in summer are not the breast-fed infants, but infants who live in basements and cellars. Thus Liefmann and Lindemann[37] inform us that in the cool part of the early summer in Berlin breast-fed infants died at the rate of 1.5 per day while in the hot part of the summer the rate was 4.5. The cellar infants died at the rate of 0.9 per day in cool weather and 2.25 per day in hot weather. Thus the death rate of the breast-fed children was increased threefold by the hot weather while that of the basement infants was only 2½ as great. This can be explained only by reason of the greater coolness of cellars and basements.

Again in the hot month of August in 1911, in Berlin, the breast-fed infants showed twice the mortality they did in the cool part of the summer, 107 dying in August as against 51 in June.

While it cannot be denied that milk, so long as it is exposed to contamination by human hands and flies, or is obtained from cows with inflammatory diseases of udder or tuberculosis, must ever be liable to convey pathogenic germs, it would seem in view of the above statements that those who would attribute the bulk of the summer mortality of infants to stale milk take a too one-sided view of the matter, and one not borne out by the facts.

The Rôle of Infections in the Summer Mortality of Infants. —The summer diarrhea of infants has presented so many of the appearances, at first sight, of a specific infectious disease, as, for example, its restriction to certain streets or sections of a city and the almost explosive rise of the mortality, that much labor has been expended to discover a specific organism.

The bacteriology of summer diarrhea was first carefully studied by Escherich[8] in Europe and Booker[3] in this country. They found no definite organism associated with summer diarrhea. In 1902 and 1903, Flexner,[10] Holt, Duval and Basset,[6] Wollstein,[67] Gary and Stanton, Waite,[62] Kendall[26] and others reported the finding of the bacillus dysenteriæ (Flexner type) in the stools of numerous infants suffering from diarrhea. It should be noted, however, that in the great majority of these cases the dejections were typically dysenteric, with blood and mucus in the stools.

Within the last few years Morgan[44, 45] and his co-workers report the isolation of a motile glucose-fermenting organism, which does not attack lactose or mannit from the stools of infants suffering from diarrhea in London during the years 1904-

1908. The organism was present in about 45 per cent. of the cases examined and produced diarrhea when fed to laboratory animals.

There is therefore evidence that a fair proportion of the deaths of children in summer are due to specific infections, but the evidence adduced is not sufficient to explain all of them in this way. Moreover, Liefmann and Lindemann[37] have studied the course of other epidemics, such as cholera epidemics in Berlin in the summer time in order to throw some light on this matter. They found that no effect ascribable to temperature was visible in the course of such epidemics, as their progress was quite uninfluenced by meteorological conditions, the curves exhibiting a remarkable contrast to the infant mortality curves in the same city.

Again McLaughlin[39] has shown that where a definite source of infection for gastrointestinal diseases exists, as, for instance, a polluted water supply, the death rate in infants from enteritis may be nearly as great in the spring as in the summer months. This has been especially true of localities which have rather cool summers.

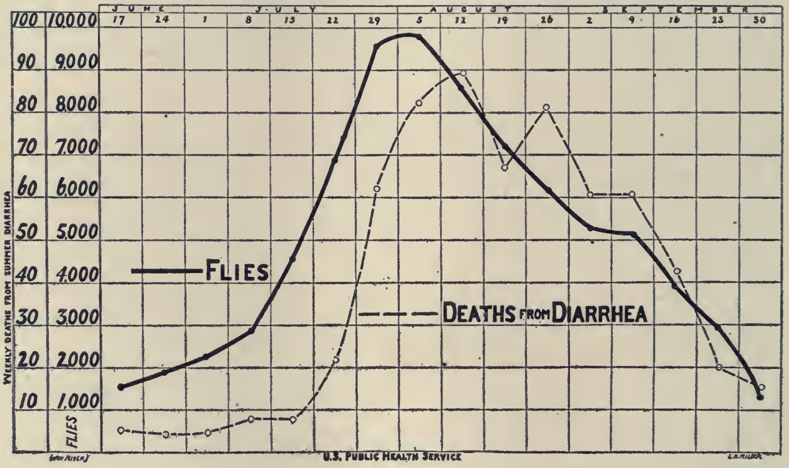
Flies.—Any hypothesis considering the summer deaths of infants as due to infections must clearly consider flies as probable or even principal carriers of the infecting organisms. The fly theory has been very carefully considered by O. H. Peters,[50] who made an intensive study of the incidence of diarrhea in two sections inhabited by workmen of the city of Mansfield, England. He found no direct proof of the agency of flies in carrying summer diarrhea and states that before this theory can be confirmed experiments of scientific accuracy will be required, such as were used to prove the transmission of yellow fever and malaria by mosquitoes. On the other hand, he could develop no data which would render the implication of flies in the transmission of gastroenteritis inherently impossible.

The following chart drawn from the data given by Niven[48] shows the incidence of flies as compared with the deaths from summer diarrhea in Manchester, England, by weeks. The incidence of flies was determined by counting the numbers caught weekly in traps located in various parts of the city.

It will be seen that the death rate in infants lags behind the fly curve and then increases at a much more rapid rate than the flies. These increase in arithmetical progression, while the increase in infant deaths from diarrhea is almost geometrical. The impression derived from this curve is that of an increase in flies and summer diarrhea, both due to a common cause.

One other difficulty is the circumstance that Peters found, while 32 per cent. of the breast-fed infants investigated developed an attack of diarrhea during their first year, that 90 per cent of the infants on cow's milk were affected. Yet it is difficult to conceive of an infection spread by flies being selective in its nature in the same age group, especially as Peters found the proportion of breast-fed and bottle-fed children receiving table food to be approximately the same.

WEEKLY DEATHS FROM SUMMER DIARRHEA (CHILDREN UNDER 1 YEAR) COMPARED WITH WEEKLY PREVALENCE OF FLIES; MANCHESTER, ENGLAND, 1905.



Besides this Peters found that the difference in the incidence noted above was dependent, not upon cow's milk *per se,* but upon the circumstance of being breast-fed or not breast-fed. It cannot be denied, however, that cow's milk, when kept uncovered in the home, is much exposed to infection by flies.

Finally Peters found that certain areas investigated had a much higher incidence of diarrhea than other sections showing a much greater prevalence of flies.

Effects of Heat upon Infants.—There remains now to examine the ways in which heat might damage the organism of the infant.

Heat Stroke in Infants.—We are all well aware that, every summer, numerous adults die in our great cities through heat stroke. As will be seen later, there seem to be strong reasons for believing the infant more sensitive to heat than the adult, so there can be no ground for thinking that when adults perish, infants escape. It has been stated, in the foregoing, hot days are accompanied by a number of deaths of infants with acute symptoms not referable to the gastrointestinal tract. It is probable that a goodly proportion of these are cases of heat stroke.

While references to heat stroke in infants in the literature are by no means numerous, a number of cases have been reported by Illoway,[21] Zahorsky,[68] Snow,[60] Finkelstein,[9] Neuman and Japha (according to Rietschel) Rietschel,[56] Liefmann and Lindemann,[37] L. F. Meyer[46] and others. They were often breast-fed infants, were usually in good health, but for the most part of the fat, pasty type. In most instances some prodromal symptoms of restlessness and fretting have been present, after which the baby was taken suddenly ill, often in the evening, with loss of consciousness, high fever, hot skin, running pulse and convulsions. The urine when examined was found to contain casts and acetone (in one case sugar, Finkelstein). With prompt hydrotherapy cures have been effected in many instances, while in others rapid death has ensued.

But, after all, only a small percentage of infants die during the summer in this fashion. Illoway estimates their number at 2 or 3 per cent., Finkelstein at 6 or 7 per cent. of the total infant summer mortality. These are simple guesses, for which there is no statistical verification.

Besides thermic fever we have two other types of affections especially fatal to infants in hot weather (*a*) typical cholera infantum, running a rapidly fatal course with watery diarrhea, vomiting, fever, frequently convulsions, and (*b*) the subacute diarrheas which may last for days or weeks before a fatal termination.

It will be well at this point to run over the principal effects which have been noted as to the action of heat upon the organism.

Tolerance of Heat.—With respect to adults, Rubner[58] found that temperatures in excess of 24° C. and relative humidities of 80 per cent. caused symptoms of heat retention to make their appearance in adults. The experiments of Flügge, Paul, Ercklentz and Heymann[13] have already been referred to as to the effects of stagnant air in setting up symptoms of heat retention.

Haldane[15] found that moderate work at wet-bulb temperatures in excess of 25.5° C. (78° F.) was impracticable by reason of symptoms of heat retention.

Effects of Heat upon Metabolism.—With rising temperatures the heat eliminated from the body by means of radiation and convection becomes progressively less until a point is reached in which all the labor of heat elimination is performed by the evaporation of moisture. Ranke[53] points out that when the body has to choose between the quantities of food necessary for nutrition and that consistent with heat regulation, it is compelled to choose the latter in self-defence. As a consequence in hot weather the appetite is greatly reduced.

As a result of calorimetric measurements, Ranke found that, with mean temperatures of 25° C. the intake of food sank in adults to energy values, below those represented by the metabolism of the fasting, resting adult.

Another effect of heat is to depress the anabolic processes. Thus L. F. Meyer[46] found, while the total weekly gains in weight by the infants at the Berlin City Orphanage during the relatively cool months of July and August, 1910, were 590 and 600 grams respectively, in the very hot months of July and August, 1911, these were but 290 and 350 grams.

Heat, sufficient to cause rises in the rectal temperature of the resting adult and other symptoms of heat retention has also the property of increasing the rate of metabolism. Sutton[61] found that in an adult exposed to relatively high temperatures (37° C.), in addition to the symptoms of heat retention, the respiratory exchange and the respiratory quotient were raised. He concludes that high temperatures accelerate the metabolism as heat does any simple chemical reaction. In this way a vicious circle is established.

Evaporation of Moisture.—While it is a matter of common knowledge that heat greatly increases the amount of water evaporated by the body, there is interest in referring to the amount of this loss. Hunt found that with high dry temperatures (wet-bulb around 70°F.) and exercise, as much as 13½ liters of water were taken daily and the secretion of urine was then by no means free. In another series of observations he found that, in spite of frequent drinking, sixteen hours were required to replace water evaporated from the body during a day's experiments in the hot room. In these latter experiments the hemoglobin index of the blood was the same before and after exposure to the heat. Therefore, the source of the water evaporated was the tissues of the body.

Effect of Heat upon the Digestive Secretions.—There is evidence to show that the activity of the digestive glands, especially the stomach, are depressed by heat. v. Salle[59] found that exposure to moderately high temperatures (29° to 31° C. [84.2° to 87.8° F.]) had the effect of greatly diminishing not only the amount of the gastric secretions, but their acidity and digestive activity. In this way the stomach not only loses a portion of its power to act upon food, but, from the diminished or absent acidity, there is a corresponding loss in the antiseptic and antifermentative action of the gastric juice.

Effect of Heat upon the Resistance to Bacteria.—The observations of Medowikow[40] show that exposure to heat has the effect of diminishing the resistance of young animals to bacteria in the intestinal tract. Medowikow exposed young rabbits to incubator temperature for twelve hours. He found, at the close of the experiment, that not only were the bacteria in the intestinal tract increased, but that, in nine cases out of ten B. coli. was present in the spleen or in the liver.

Effects upon the Infant Organism.—Let us now examine in what way the results enumerated above can be interpreted with respect to infants.

Metabolism of the Infant.—In the first place, the metabolism of the infant is keyed to a much higher plane than that of the adult. According to Nieman[47] the rate of respiratory exchange of the infant is higher than that of the resting adult and corresponds to that of the adult doing moderate work. The total daily metabolism, in infants, is about 100 calories per kilogram and from 50 to 90 calories are required to maintain the vital processes exclusive of the amounts retained for the purposes of growth. This corresponds to the energy quotient of an adult doing fairly severe muscular work.

Another evidence of the more active metabolism of the infant is shown by the skin temperature. Rubner[58] found that a thermometer placed between the skin of an adult's chest and a woollen undershirt registered about 32°C. Liefmann and Lindemann[37] state that thermometers inserted between the skin and clothing of infants register between 34° and 35° C.

Since the metabolism of infants is higher, they produce much more heat than the adult in proportion to their weight. Though it is true that they have also a proportionately greater skin surface to provide for the elimination of this increased amount of heat, it must follow that when the escape of heat is prevented by meteorological conditions, their greater rate of metabolism must favor heat retention.

Thermo-regulation in the Infant.—We can deduce from the above, for the infant, narrower temperature limits within which heat regulation is efficient than for adults, and, consequently, a more labile condition of temperature equilibrium. Experimentally such has proven to be the case. The observations of Generisch,[14] Rietschel,[57] Kleinschmidt,[27] Heim and John[17] show that when infants are experimentally exposed to moderately high heat (28° to 32° C.) a rise in their body temperatures takes place. This rise was found to be greater in infants suffering from disturbances of the nutrition (Kleinschmidt, Rietschel).

Meinert,[41] in his investigations in Dresden, found that the rectal temperatures of infants, in homes where the indoor temperatures were high, were increased to 39° or 40° C., although, according to the parents' statements, the infants had been comparatively well.

Reduction of Tolerance for Food.—Another effect of heat is the reduction of the tolerance for food. Ranke's observations in respect to this effect of heat upon adults have already been mentioned. The adult, however, taking both solids and liquids, can diminish the one and increase the other.

Meinert[41] points out that, in the breast-fed infant, this demand for increased liquids is regulated by the breast, for, as a result of numerous observations, he has found that breast milk is more fluid in the summer than in the winter. Indeed, this is to be expected, as in hot weather the mother will instinctively drink more and eat less.

Besides this, v. Pirquet[51] also points out that not only the quantity, but the quality of the food obtained by the breast-fed child is influenced by its appetite. In hot weather, when this is reduced, it quickly ceases to suck, hence it receives only the more fluid "fore-milk," while the rich "after-milk" remains in the breast.

The bottle-fed child is far more passive in respect to its food, which it obtains with a minimum effort through the effects of gravity. It, therefore, varies its intake far less than the breast-fed child. Moreover, its increased thirst often leads the mother to satisfy it with additional food instead of water.

It is obvious, under these conditions, that bottle-fed babies are often relatively over-fed in hot weather, a circumstance commented on by numerous authors.

Another effect of heat of importance to the digestion of infants is the diminution of the quantity, acidity and activity of the gastric juice, as shown by v. Salle's experiments and the resistance of the intestinal tract to bacteria as demonstrated by Medowikow.

Not only will the digestive processes take place with greater slowness, thus favoring stagnation of the intestinal contents, but the deficient acidity of the gastric juice may, doubtless, permit pathogenic germs, which would otherwise succumb to its acidity, to gain access to the intestine. The diminished resistance of the intestine to bacteria would permit the proliferation of germs introduced in this manner, or favor endogenous infections.

We see from the foregoing that there are a number of reasons why heat should exercise a particularly deleterious influence on infants. There remains for final examination the possible effects of heat in respect to cholera infantum and the subacute intestinal infections.

Effect of Heat in Producing Cholera Infantum.—Typical cholera infantum has always been regarded by the earlier American authors (cf. Miller) as a heat effect. The following reasons have been advanced by Meinert, Rietschel and others for regarding it from this standpoint:—

(1) This severe form makes its appearance only after exposure to very hot weather or high indoor temperatures.

(2) It often attacks infants hitherto in the best of health. Meinert found that 54 per cent. of all the infants whose deaths he investigated had always enjoyed good health, while Johnston,[24] from his observations in Leicester, places this at 75 per cent.

(3) The bacteriological findings and postmortem appearances in cholera infantum are far more indefinite than in the subacute intestinal affections.

(4) High fever is usually present.

(5) A heat effect may be inferred *ex juvantibus,* or, in other

words, the most effective treatment is removal to a cool location, hydrotherapy and restoration of the body fluids.

In this connection a case recited by Rietschel[56] is instructive. During the summer of 1911 an artificially-fed infant, receiving excellent milk both from a quantitative and qualitative standpoint from the Dresden Saüglingsheim, lived in a dwelling where continuously high temperatures were registered. The infant bore the heat very well up to the 8th of August. No diarrhea was present up to that time, the bowels being somewhat constipated. On that date slight diarrhea made its appearance, but the child, while listless, seemed comfortable. On the 9th the symptoms suddenly changed. The diarrhea became spurting, and the child's temperature rose to 40°C. The infant was quickly removed to the hospital, where the fever was reduced by hydrotherapy. We are not informed by Rietschel as to the subsequent fate of the child.

Subacute Diarrhea.—While in this class of affections the influence of heat is by no means so apparent; from the statements already made, however, it must be conceded that heat has important predisposing effects, in the following ways:—

(1) By reduction of the tolerance for food.

(2) By reduction of the activity of the digestive secretions.

(3) By reduction of the normal resistance of the intestines to bacterial invasions.

Clinical experience has shown that stormy symptoms can be induced by feeding infants excessive amounts of the purest food, from the bacteriological standpoint. The relative reduction of the tolerance for food by the action of heat must, as has already been pointed out, produce many instances of overfeeding, leading to nutritional disturbances.

The continued influence of heat upon the infant whose nutrition has been thus disturbed leads to disturbances of the thermal regulation, which has been found to be more labile in children with digestive disorders. This, in turn, has the effect of still further lowering the tolerance for food so that, in this way, a vicious circle is established. Added to this are the weakness of the digestive secretions, the stagnation of food in the intestine and increased susceptibility to exogenous and endogenous infections.

It seems clear, from the foregoing, that we must regard heat as a powerful factor in directly determining the summer mortality of infants. Yet to ascribe all summer mortality directly to this cause would be as one-sided as to ascribe it all to the method of feeding.

I think, however, that the recent observations recorded have furnished us with lines of much greater precision on which to base our preventive measures. Our attention has, besides, been especially directed anew to the influence of poor housing conditions in the production of summer deaths in babies.

The indications for prophylaxis are plain. They consist, hand in hand with an improvement in housing conditions and the development of residential suburbs, in a greater emphasis upon the care of infants in their homes in the summer months. Mothers must also be informed of the fact that excessive heat, *per se,* is deleterious to infants and, when hot weather is present, special efforts must be made to prevent overheating and relative overfeeding of babies by the use of frequent tepid baths, light clothing, fresh air, increase in the amount of water given, lengthening of the feeding intervals and reduction in the amounts of food. The advantages of breast-feeding are only emphasized by all that has been brought out. Here nature automatically modifies the composition of the food in accordance with the heat in a way to which artificial feeding can never compare.

CONCLUSIONS.

(1) The action of heat as a direct cause in the summer mortality of infants has been greatly underestimated in the last twenty-five years. In the future much more weight should be given to its influence.

(2) The lethal action of heat is a function, not so much of the maximum and mean temperatures of the external air as of the indoor temperatures, which, in the late summer, may continue to be high in spite of remissions in temperature of the external air.

(3) The action of dirty and stale milk in causing the death of infants has been given a significance which has overshadowed other factors of equal or greater importance.

(4) There is evidence to show that a certain proportion of infant deaths are due to specific infections, in the dissemination of which contact infection and flies doubtless play a part.

(5) As a result, future activities for the prevention of in-

fant mortality must concentrate themselves to a greater extent on the question of housing, especially the conditions productive of high indoor temperatures, such as overcrowding, narrow streets and the absence of through ventilation.

(6) Poor housing conditions can be partially neutralized by the proper care of babies in the summer. The general public should be educated as to the importance of high indoor temperatures in causing the death of infants, and, especially as to measures which prevent babies from suffering from the heat.

(7) Breast feeding must still be regarded as a most, if not the most, important preventive of the summer death of infants.

BIBLIOGRAPHY.

1. Ballard, H. Report on Diarrhea. Supplement to the Annual Report of the Local Government Board. London, 1889.
2. Bassett, V. H. Studies of the Diarrheal Diseases of Infancy. Studies Rockefeller Institute for Medical Research, 1904, Vol. II., pp. 88-93.
3. Booker, W. D. A Bacteriological and Anatomical Study of the Summer Diarrhea of Infants. Johns Hopkins Hospital Reports, 1896, Vol. VI., pp. 159-258.
4. Chapin, C. V. Report upon a Study of Environmental Conditions and Infant Health in Providence. Transactions of the American Medical Association for the Study and Prevention of Infant Mortality, 1912, Vol. III., pp. 279-281.
5. Cordes, I. Studies of the Diarrheal Diseases of Infants. Studies Rockefeller Institute for Medical Research, 1904, Vol. II., pp. 67-72.
6. Duval, C. W., and Bassett, V. H. The Etiology of Summer Diarrhea in Infants. Studies Rockefeller Institute for Medical Research, 1904, Vol. II., pp. 7-25.
7. ———— and Schorer. Studies of the Diarrheal Diseases of Infants. Studies of the Rockefeller Institute for Medical Research, 1904, Vol. II., pp. 42-54.
8. Escherich, Th. Die Bedeutung der Bakterien in der Aetiologie der Magendarmkrankheiten der Saüglinge. Deut. Med. Woch., 1898, Nos. 40 and 41, pp. 633, 649.
9. Finkelstein, H. Ueber den Sommergipfel der Saüglingssterblichkeit. Deut. Med. Woch., 1909, No. 32, pp. 1,375-1,391.
10. Flexner, S. Investigations During the Summer of 1903. Studies Rockefeller Institute for Medical Research, 1904, Vol. II., pp. 31-41.
11. Flügge, C. Das Wohnungsklima zur Zeit des Hochsommers. Beitr. z. Hyg., No. 2, Leipzig, 1879.
12. ————. Aufgaben und Leistungen der Milchssterilization. Zeit. f. Hyg., Vol. XVII., 1894, pp. 272-342.
13. Flügge, Heymann, Paul and Ercklentz. Zeit. f. Hyg., 1905, Vol. XLIX., pp. 363-446.
14. Generisch. Der Einfluss der Wärme auf die Temperatur der Saüglinge. Monatschr. f. Kinderhk., Vol. IX., 1910-1911, pp. 183-199.
15. Haldane, J. S. The Influence of High Temperatures. Journal of Hygiene, 1905, Vol. V., pp. 494-513.
16. Hammerl, H. Beobachtungen über die Temperaturverhältnisse in Arbeiterwohnungen während der heissen Jahrezeit. Arch. f. Hyg., 1906, Vol. LVI., pp. 22-29.
17. Heim and John. Der Thermoregulation des gesunden und ernährungegestörten Saüglings. Jahrb. f. Kinderhk., 1911, Vol. LXXIII., Heft 3.
18. Helle, K. Weitere statistische Erhebungen über der Sterblichkeit der Saüglinge an Magendarmkrankheiten. Arch. f. Hyg., 1906, Vol. LVI., p. 20.
19. Helmholz, H. F. Report on Study of Temperature and Infant Health in Chicago. Transactions of the American Association for the Study and Prevention of Infant Mortality, 1912, Vol. III., p. 282.
20. Hunt, E. H. The Regulation of Body Temperature in Extremes of Dry Heat. Journal of Hygiene, 1912, Vol. XII., pp. 479-488.
21. Illoway, H. Heat Stroke (Thermic Fever) in Infants. Cincinnati Medical News, 1891, Vol. XX., pp. 577-588.
22. ————. Cholera Infantum. New York Medical Journal, 1894, Vol. LX., p. 301.
23. ————. Summer Complaint. New York Medical Journal, 1892, Vol. LVI., pp. 284, 314.

24. Johnston (according to Uffelmann). Zur Aetiologie der Cholera Infantum besonderer Berücksichtigung des Ergebnisses der Johnston'sche Untersuchungen in der Stadt Leicester. Deut. Med. Woch., 1880, No. 10, pp. 113-116.
25. Kathe, H. Sommerklima und Wohnung und Saüglingssterblichkeit. Klin. Jahrb., 1911, Vol. XXV., pp. 319-425.
26. Kendall, A. I. Studies of the Diarrheal Diseases of Infants. Studies Rockefeller Institute for Medical Research, Vol. II., 1904, pp. 76-81.
27. Kleinschmidt, H. Der Einfluss der Hitze auf den Saüglings Organismus. Monatschr. f. Kinderhk., 1910-1911, Vol. IX., pp. 455-504.
28. Klose, E. Ueber den Sommertod der Saüglinge. Monatschr. f. Kinderhk., 1910-1911, Vol. IX., pp. 217-240.
29. Knox, J. H. M. The Effect of Moderately High Temperatures on the Infant. Archives of Pediatrics, New York, 1913, Vol. XXX., pp. 191-196.
30. Kruse. Was lehren uns die letzten Jahrzehnten und der heisse Sommer 1911 über Saüglingssterblichkeit und ihre Bekämpfung. Centralbl. f. allg. Gesundhtspflg., 1912, Vol. XXXI., pp. 175-201.
31. Kubly (cited by Meinert). Untersuchungen über die Wohnungsverhältnisse der ärmeren Bevölkerungsklasse Dorpats unter besonderen Berücksichtigung der Luftkonstitutions der Wohnungen. Diss., Dorpat, 1867.
32. La Fétra, L. E., and Howland, J. A Clinical Study of Sixty-two Cases of Intestinal Infection with the Bacillus Dysenteriae (Shiga). Studies Rockefeller Institute for Medical Research, 1904, Vol. II., pp. 137-146.
33. Lewis, P. A. Studies of the Diarrheal Diseases of Infants. Studies Rockefeller Institute for Medical Research, 1904, Vol. II., pp. 82-97.
34. Liefmann, H. Die Bedeutung sozialer Momente für die Saüglingssterblichkeit, nebst kritischen Bemerkungen zur Milchssterilizationsfrage. Zeit. f. Hyg., 1909, Vol. LXII., pp. 199-260.
35. ————. Ueber den Einfluss dr Wohnungsverhältnisse auf dem Sommertod der Saüglinge. Hyg., Rundsch., 1911, Vol. XXI., pp. 1,317-1,322.
36. ————. Der Einfluss der Hitze auf die Sommerssterblichkeit der Saüglinge. Reichs Med. Anz., 1912, Vol. XXVII., p. 742.
37. ———— and Lindemann, A. Der Einfluss der Hitze auf die Sterblichkeit der Saüglinge in Berlin und einigen anderen Grossstädten. Viertljhr. f. off. Gesundhtspflg., 1911, Vol. XLIII., pp. 333, 375.
38. ———— and ————. Die Lokalization der Saüglingssterblichkeit und ihre Beziehung zur Wohnungsfrage. Med. Klin., 1912, pp. 1,074-1,077.
39. McLaughlin, A. J. Sewage-Polluted Water Supplies in Relation to Infant Mortality. Reprint No. 77, Public Health Reports, Washington, 1912.
40. Medowikow, P. S. Zur Frage von der Verminderung der baktericiden Kraft des Dünndarms unter Einwirkung einigen inneren und aüseren Agentien. Arch. f. Kinderhk., 1910-1911, Vol. LV., pp. 314-356.
41. Meinert, E. Untersuchungen über den Einfluss der Lufttemperatur auf die Kindersterblichkeit an Durchfallskrankheiten. Deut. Med. Woch., 1888, Vol. XIV., pp. 491-493.
42. ————. Ueber Cholera Infantum Aestiva. Ther. Monatshft., 1891, Vol. V., pp. 520, 567, 623.
43. Miller, C. A Contribution to the Etiology, Pathology and Therapeutics of Cholera Infantum. American Journal of Obstetrics, 1879, Vol. XII., pp. 236-251.
44. Morgan, H. de R. Upon the Bacteriology of the Summer Diarrhea of Infants. British Medical Journal, 1906, pp. 908-912.
45. Morgan and Ledingham. The Bacteriology of Summer Diarrhea. Proceedings of the Royal Society of Medicine, Vol. II., Part 2, pp. 133-149.
46. Meyer, L. F. Die Morbidität und Mortalität der Saüglinge im Sommer 1911. Verhandl. d. Gesellsch. f. Kinderhk. Deut. Naturf. u. Aertzt., 1911, Wiesbaden, 1912, Vol. XXVIII., pp. 55-61.
47. Niemann. Der Gesamtstoffwechsel eines künstlich genährten Saüglings. Jahrb. f. Kinderhk. u. Phy. Erzh., 1911, Vol. LXXIV., p. 62.
48. Niven, J. Manchester Health Officer's Reports [1904-8].
49. Park, Wm. H., and Holt, L. Emmett. Report upon the Results with Different Kinds of Pure and Impure Milk in Infant Feeding in Tenement Houses and Institutions in New York City. Studies Rockefeller Institute for Medical Research, 1904, Vol. II., pp. 1-25.
50. Peters, O. H. Observations on the Natural History of Epidemic Diarrhea. Journal of Hygiene, 1910, Vol. X., pp. 602-777.
51. v. Pirquet, C. Schematische Darstellung der Saüglingsernährung zur Unterrichtszwecken. Zeit f. Kinderhk., 1910-1911, Vol. I., pp. 118, *et seq.*
52. Prausnitz. Sommerssterblichkeit der Saüglinge. Verhandl. d. Gesell. f. Kinderhk. Deut. Naturf. u. Aertzt., 1911, Wiesbaden, 1912, Vol. XXVIII., pp. 1-25.
53. Ranke, K. E. Uber die Abhängigkeit der Ernährung von Wärmehaushalt, nach Versuchen in den Tropen, im gemässigten Klima und im Hochgebirge. Münch. Med. Woch., 1905, No. 2, pp. 64-68.
54. Rietschel, H. Die Sommerssterblichkeit der Saüglinge. Ergebnisse d. Inner. Med. u. Kinderhk., 1910, Vol. VI., pp. 369-490.
55. ————. Sommerhitze, Wohnungstemperature und Saüglingssterblichkeit. Zeit. f. Kinderhk., 1910-11, Vol. I., pp. 546-571.

56. ———. Die Sommerssterblichkeit der Saüglinge. Verhandl. d. Gesell. f. Kinderhk. Deut. Naturf. u. Aertzt., 1911, Wiesbaden, 1912, Vol. XXVIII., pp. 26-54.
57. ———. Zur Aetiologie des Sommerbrechdurchfalls der Saüglinge. Monatschr. f. Kinderhk., 1910-11, Vol. IX., pp. 39-51.
58. Rubner. Lehrbuch der Hygiene, 1907, eighth edition.
59. v. Salle. Ueber den Einfluss hoher Sommertemperatur auf die Funktion des Magens. Verhandl. d. Gesell. f. Kinderhk. Deut. Naturf. u. Aertzt., 1911, Wiesbaden, 1912, Vol. XXVIII., pp. 72-83.
60. Schwarz, H. Nursing Statistics from the Study of the Infancy of 1,500 Children and a Contribution to the Causes of Summer Infant Mortality. ARCHIVES OF PEDIATRICS, New York, 1911, Vol. XXVIII., pp. 668-676.
61. Snow, Irving M. Heat Stroke in Infants. ARCHIVES OF PEDIATRICS, 1898, Vol. XV., p. 741.
62. Sutton, H. The Influence of High Temperatures upon the Body, Especially with Regard to Heat Stroke. Journal of Pathology and Bacteriology, 1908-9, Vol. III., pp. 63-73.
63. Waite, W. W. Studies of the Diarrheal Diseases of Infants. Studies Rockefeller Institute for Medical Research, 1904, Vol. II., pp. 71-75.
64. Willim, R. Ueber die Beziehungen zwischen Saüglingssterblichkeit und Sommertemperatur. Zeit. f. Hyg., 1908-9, Vol. LXII., pp. 95-130.
65. Wollstein, M. The Dysentery Bacillus in Relation to the Normal Intestines of Children. Studies Rockefeller Institute for Medical Research, 1904, Vol. II., pp. 193-202.
66. Wollstein, M. and Dewey, G. Studies of the Diarrheal Diseases of Infants. Studies Rockefeller Institute for Medical Research, 1904, Vol. II., pp. 55-66.
67. Zahorsky, J. Thermic Fever in Infants. ARCHIVES OF PEDIATRICS, 1898, Vol. V., p. 143.

STOOL DISINFECTION.—Kaiser (*Archiv für Hyg.*, 1913, Vol. XLVIII., Nos. 4 and 5). The disinfection of the stool is as difficult as it is often important. The mere addition of antiseptics, such as phenol, sublimate or formalin, is quite insufficient. A method, depending rather upon thermal than chemical action, has been worked out by Kaiser. Small pieces of quick-lime, amounting in all to about one-fourth the volume of the stool, are added to the latter. No stirring or breaking up of the stool is necessary. Hot water (50° to 70° C.) is poured over the mixture and the whole set aside for two hours. Disinfection is then complete.—*Interstate Medical Journal.*

COXA VARA.—J. W. Sever (*Boston Medical and Surgical Journal,* 1913, Vol. CLXVIII., p. 495) says that rachitic coxa vara is a frequent and concomitant condition of bow legs and knock knees, but may exist independently. In the writer's series of cases it was observed to a greater degree in knock knees than in bow legs. The condition apparently requires no treatment. The correction of a coexisting condition of knock knees or bow legs may hasten the process of recovery from coxa vara. In all cases there is a tendency to spontaneous recovery and a restoration toward the normal angle of the neck of the femur without treatment, and with no cessation from use or weight bearing. There is probably very little or no permanent disability in the average case.

THE MEDICAL SUPERVISION OF THE CHILD BETWEEN INFANCY AND SCHOOL AGE.*

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The source of many physical and mental defects of school children can be traced to disturbances arising during the first five years of life. Early infancy is now receiving more medical, supervisory, and philanthropic care than ever before, owing to the inception of the movement against infant mortality. As a result, the mortality and morbidity during the first year of life have undergone a remarkable reduction. After the fifth year the child goes under systematic medical inspection when he enters school and passes from the narrow confines of family life to the wider scope of school and social life. There is left, therefore, a wide gap in the medical supervision of the young child between the first and fifth year. This period of early childhood is the most important and the most neglected one in the child's life. During this time the child learns to walk and to talk, the milk teeth appear, there is a rapid growth in weight and height, and the brain develops with great rapidity. It has been said that the child learns more in the first five years than in the rest of its life. Certain diseases are more apt to appear during this period, and being forewarned one should be forearmed. The creeping of the child on dirty floors, with the inborn tendency to place everything in its mouth, produce numerous mouth and throat diseases, contagious affections of the skin and mucous membranes, diphtheria, whooping-cough, worms, tuberculosis, etc. Changes in the structure of the bones, the result of improper and insufficient nutrition, are manifested by curvatures of the spine, chest and extremities. Defects in the normal development of the brain are recognized by delayed intelligence, locomotion or speech.

Dr. Kerr has called attention to the untouched reservoirs of disease during this period. Dr. Forsyth has been making, for several years past, a systematic medical examination of children under school age in the Westminster district of London, and finds that there is a rapid rise in the tide of disease with each year of life. The majority of children examined at the end of the first year were found to be healthy, but only a very few came through to their fifth year without at least one physical defect of some kind or other. Of 374 children under observation, 332 presented physical defects. Sixty-four per cent. of the four-year-old children had dental caries; a condition which is probably responsible for more ill health in children than any other one cause.

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* Read at the Fourth International Congress on School Hygiene, Buffalo, August 29, 1913.

Oliver Wendell Holmes once said that "Children in order to be strong and robust should choose healthy grandparents." Prenatal influences and heredity play a large part in the problem before us, and it is a most encouraging sign that such widespread interest is now taken regarding eugenics. All efforts to improve our race and produce better babies should be encouraged.

More important than the influences of heredity or eugenics are the effects of environment or euthenics on the period of early childhood. Most of the disorders are the direct result of ignorance—ignorance on the part of the parents in feeding, clothing, training, and treating their children; ignorance on the part of many physicians, who, not realizing the great importance of this period of plasticity and susceptibility to disease, become careless in their examination. It is a very difficult thing to make a thorough physical examination of a young child who resists every approach and is terror-stricken by the close presence of a stranger. Serious and preventable ailments are often overlooked or are loosely diagnosed as teething or worms. Ignorance on the part of the dentist is responsible for unnecessary removal of teeth and the spread of dental caries. Very few dentists, unfortunately, appreciate the necessity of filling small cavities in the milk teeth. It requires tact, skill and patience to fill the teeth of a young child, but it can be done and should be done. Extraction should be the last resort. Intelligent treatment of the milk teeth by the dentist would prevent much sickness and subsequent deformity of the jaws.

The nervous child is perhaps a product of our present-day civilization. Nervous parents nowadays are not the exception, but the rule, and their offspring usually exhibit the same characteristics very early in life. The neurotic temperament has been defined as "a disposition in which the emotions are easily kindled and are controlled and restrained imperfectly or with difficulty."

This neurotic disposition may or may not be inherited, but there is no question as to the effect of highly-strung, emotional and over-anxious parents on a child during these early years of development. The environment of the nervous child, as well as his personality, should always be considered in relation to his ailment. Instead of saying, "Like father, like son," it should rather be said, "As the father lives, so lives the son." Under proper surroundings and tactful supervision these nervous tendencies can be held in check, and it is a sad commentary upon our alleged improved methods of child care and training that nervous exhaustion in young children is becoming more frequent. This is produced by insufficient sleep, late bed hours with no day-time nap, improper nourishment, intemperate play, and uncontrolled temper.

The highest duty of the parent, educator, and physician is to maintain the health of these children at its highest level and to intelligently train and direct their minds.

The question of when to send the child to school is of importance in this connection. Not when he should commence his education, for that should be started very early in life, but when should he begin school. Compulsory education in England begins at five, in Germany at six, and in France at seven, while in the United States the average might be placed at six years.

Mr. Winch, Inspector of Schools for the London County Council, made a careful investigation into this question from the standpoint of a psychologist, not a physician. There is a feeling among some educationalists that the more teaching the child gets and the sooner he begins school, the more progress he is sure to make, while on the other side there is a growing sentiment that the attendance in school, in England at least, begins too early and that there is an educational disadvantage in commencing too soon. Mr. Winch came to the conclusion that the entrance age of from three to five years conferred no intellectual advantage on the child either in his school work or in his subsequent progress in later life, and, further, that no advantage appeared to exist in early entry so far as the subsequent attainment of good behavior and the development of attentiveness were concerned. It would seem, then, that there was no educational advantage in sending children to school before the age of five, so the sole consideration is the health of the child.

Dr. Isaac A. Abt, of Chicago, who made a very careful inquiry into the status of the kindergarten, concluded that each child should be considered as an individual and that the kindergarten is not necessary for all children and is not suitable for some. In other words, the desirability of the kindergarten depends upon the state of health of the child, the qualifications of the teacher, the disposition and capacity of the mother, the environment of the home, and the equipment of the kindergarten. This question of sending children to school before the age of six is dependent upon the social conditions surrounding the child. If the child can have out-door life and individual care and proper attention at home, there is no question but that home is the best place. On the other hand, there are a large number of children in every city for whom early schooling is a God-send—children who go from squalor and filth and dirt and bad air to well-ventilated rooms to be taught how to play, the necessity for keeping themselves clean, and the rudiments of living. Provision should be made for children of this type in the public schools situated in the crowded districts of our cities. These children would receive careful medical inspection and supervision, and many physical defects and ailments could be remedied before the serious work of school commenced.

Dr. W. Leslie Mackenzie, who is the Medical Health Officer of Scotland, advocates the establishment of what he terms "nursery schools." These are a combination of the day nursery and kindergarten. The children are allowed to play under the guidance of a trained teacher and are made to take a nap in cribs specially provided for this purpose when they seem tired or sleepy. At this age he insists "that it is not 'discipline' that the child needs, nor 'teaching'; it is watching, understanding, sympathetic intuition, lines of directive play, exploitation of infant spontaneity, and superintendence of growth." The child needs appreciation at this period of life and it is the teacher that needs restraint. The school nurse has the opportunity of visiting the homes of these children and would be able to report to the proper medical authorities on the physical condition of the children and the sanitary state of the homes.

The local Health Officer should be given authority to inspect the home and improve any necessary hygienic and sanitary conditions and to educate and instruct parents regarding the life and health and nourishment of the child. The State has already assumed the oversight and the care of the children on reaching school age and has placed upon the municipal authorities the responsibility for the care and treatment of those found mentally deficient or diseased. This oversight could extend to the earlier years of life so as to prevent many of the defects, both mental and physical, which are first recognized and treated during school age. This would be the highest of all preventive work and would save much unnecessary suffering.

Our greatest weapon to overcome the ignorance of the parents, physicians and dentists is education. Parents of the poor and ignorant classes can be reached through the visiting nurse and the Health Physician. For this class of people in some of our cities a number of philanthropic agencies have reached into the homes of these people and have accomplished good results in educating people by direct personal instruction in the elements of hygiene. Dr. Josephine Baker instituted Little Mothers' Leagues among the public school children of New York City, and reaches the ignorant parents by means of the children, who are instructed at the schools in the care of children and in the importance of personal and family hygiene. More intelligent parents can be reached by suitable literature and by popular lectures. The public schools could be used for lectures to parents on the care of children, the importance of proper diet, the care of the first teeth, etc.

Medical men should be made to realize the importance of this period in the child's life and should be able to give proper advice as to the maintenance of health in young children. More attention should be paid to this matter in our medical colleges and young doctors should start in their professional careers with a knowledge of the nutritional demands and the physical characteristics of early childhood. They should also receive instruction regarding the recognition and treatment of the deficient or the backward child. The dentists should realize that they have a responsibility in the health of young children and should be taught that it is far better to fill a milk tooth than to remove it. Parents who are wise should have their children's teeth inspected periodically, and they should receive intelligent attention and instruction in dental and oral hygiene from the dentist.

In order, therefore, to solve the problem of the health of children under school age a campaign of education should be inaugurated and means should be devised for the medical supervision of young children and of their homes.

CURRENT LITERATURE.

ABSTRACTS IN THIS NUMBER BY
DR. CHARLES E. FARR. DR. H. R. MIXSELL.

THERAPEUTICS.

MIXSELL, RAYMOND BOILEAU: THE INTRAVENOUS ADMINISTRATION OF DIPHTHERIA ANTITOXIN. (*California State Journal of Medicine,* August, 1913, p. 323.)

Mixsell briefly reviews the earliest attempts at intravenous medication and cites laboratory evidence that would tend to prove that the intravenous administration of diphtheria antitoxin is the ideal method, especially since experiments have shown that this method puts the greatest amount of antitoxin in the blood stream just when it is most needed early in the disease. A series of experiments, however, carried on at the Willard Parker Hospital during the winter months of 1911 would tend to prove, from a study of the death rate, that there is very little clinical difference between the effects of the subcutaneous and the intravenous administration.

The cases selected for the series were those falling under the head of diphtheritic laryngitis and consisted of croup cases, intubated or not intubated, just as they were admitted to the diphtheria service of the hospital. The series was limited to croup cases because of their greater severity and because immediate results, either good or bad, were more apparent and easier to analyze. In 158 consecutive admissions of this class of cases every odd numbered admission was given antitoxin intravenously, and every even numbered admission was given antitoxin subcutaneously in the usual manner. In this way records were obtained of a series of 79 intravenous cases and 79 subcutaneous cases.

Almost every child entering the hospital with a bronchopneumonia went on to a fatal termination without regard to the amount of antitoxin or the method of its administration. After an analysis of the death rate of the series, and a comparison of the series with the death rates of previous years, the following conclusions are reached:

(1) The intravenous administration of antitoxin in young children, although not always easy, is perfectly safe when done with skill and care.

(2) The operation does not, as a rule, commend itself to private practice and ordinarily should be performed only under the best of conditions.

(3) There appears from a study of 158 cases to be so little clinical difference in the results obtained from the intravenous and subcutaneous exhibition of antitoxin that we are not warranted in asserting that one method is more efficacious than the other.

(4) Except in severe septic cases, therefore, and in cases seen late in the disease, the subcutaneous method is to be preferred.

(5) Antitoxin given subcutaneously should be given in large initial doses. HAROLD R. MIXSELL.

SURGERY.

OLLERENSHAW, ROBERT: SACROCOCCYGEAL TUMORS. (*Annals of Surgery,* September, 1913, p. 384.)

Apart from the ordinary neoiplasm, such as lipomata, angiosarcomata, and lymphangiomata, and from the spinal defects, there are, in the sacral region, a number of congenital tumors, which may be divided, according to Ollerenshaw, into (1) caudal appendages, (2) dermoid cysts, (3) mixed tumors, (4) fetal inclusions. Of the caudal appendages there are two types, true tails and pseudotails, the former being definite prolongations of the sacrum, consisting of new growth of cartilage and bone, while the false tails are due to persistence of the caudal filament or may be simply tail-shaped lipomata. The dermoid cysts are found in the form of sinuses or simple dermoids at the lower end of the sacrum or coccyx and are very prone to irritation and suppuration. The mixed tumors are very complex structures, containing cysts lined with various kinds of epithelium, glandular epithelial collections, bone and cartilage, smooth and striped muscle, nerve and fat tissue, etc. The origin of these tumors is in doubt. They may be the remains of a second fetus or, possibly, simply hyperplasias of the neighboring transitory organs, such as the postanal gut, the caudal medullary tube, etc. The fourth class, or fetal inclusions, takes in the group of double formations of all degrees.

The author's case was a monogerminal mixed tumor of the cystic type, which is the most common type of all. They are of varying sizes and vary greatly in rapidity of growth. The tumor in this case was the size of a fetal head and was in the perineal region of a female child four days old. The family history was negative for deformities or pleural births. The cyst was drained of several ounces of serum and another smaller cyst tapped. A few weeks later the solid part of the tumor, which lay between the rectum and the sacrum, was excised under ether. It was six inches long, four and one-half inches across and about the same depth. The coccyx had to be removed with the tumor. Microscopic examination of the excised tumor showed fibrous and fat tissue, bone and bone marrow, striped muscle, salivary gland, and what appeared to be a rudimentary stomach. The child made a complete recovery. CHARLES E. FARR.

BOOK REVIEW

CHIRURGIE INFANTILE. By A. BROCA, Professeur à la Faculté de Médecine de Paris; Chirurgien de l' Hôpital des Enfants Malades. Ave. 1,259. Paris: G. Steinheil, Editeur. 1914.

Professor Broca's book is by far the largest and most pretentious of the rather large number of works on surgery in children which have recently appeared. It is issued in two large volumes containing over eleven hundred pages and more than twelve hundred illustrations. Twenty pages are devoted to the index, which is fairly complete. The book is attractively gotten up, is printed in large type on a good quality of paper and the illustrations, although rather diagrammatic and sketchy in nature, really illustrate the text. As the author well says, the expense of producing so many drawings in anything more than outline would be prohibitive.

It is impossible to review such an extensive work and do it justice. It must be seen and studied carefully to be appreciated, as no doubt it will be, by all those interested in the subject. It must suffice to state that every chapter and every page show the master-workman who speaks with an authority gleaned from an enormous experience. The work has all the strong points and but few of the weak ones of the one-man book, and represents the ripened wisdom of an exceptionally able man who has devoted much thought and study, as well as clinical observation, to the subject. There are, of course, many points on which American readers will not agree with the distinguished author, such as, for instance, the use of ethyl chloride and chloroform as a routine measure in the production of anesthesia, but all will agree that the book will well repay a very careful and detailed study. CHARLES E. FARR.

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